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THE

AUSTRALIA DIRECTORY.

VOLUME I.

SOUTH AND EAST COASTS, BASS STRAIT, AND TASMANIA.

BEING CHIEFLY THE RESULT OF VARIOUS SURVEYS MADE BY ORDER OF THE
LORDS COMMISSIONERS OF THE ADMIRALTY.

ORIGINALLY COMPILED BY

CAPTAIN CHARLES B. YULE, R.N.

EIGHTH EDITION.

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The sources from whence the early editions of this volume of the Australia Directory were derived, namely, Captain Flinders' original survey of the coast, and the subsequent examination of various parts of it by Captains Sir J. G. Bremer; P. P. King; Owen Stanley; J. L. Stokes; F. P. Blackwood; J. C. Wickham; C. B. Yule; T. Lipson; and J. S. Roe, of the Royal Navy; also from the published voyages of the French navigators D'Entrecasteaux and Freycinet, the Remark Books of several of Her Majesty's ships, as well as the reports of Lieutenant Jeffreys; the whole comprised between the years 1793 and 1853, have equally furnished material in the compilation of the present edition.

To these reliable authorities, were added the results of various detached surveys subsequently undertaken by the Imperial and Colonial Governments, extending from King George Sound to Sydney, New South Wales, made by Captain H. M Denham, Commanders Ross, Cox, and Hutchison, of the Royal Navy, as also by the harbour authorities of the several provinces extending to 1865, the whole being compiled in 1868, as the Sixth edition, by Captain C. B. Yule, R.N.

The Seventh edition, published in 1876, contained further results from surveys continued by Commander F. W. Sidney, Staff-Commanders F. Howard, H. J. Stanley, and J. T. Gowlland, to 1875.

In the present edition, revised by Captain G. H. Inskip, R.N., additional results have been incorporated from the surveys of Staff Commanders H. J. Stanley, F. Howard, W. E. Archdeacon, and J. E. Coghlan, together with information derived from Official Colonial Documents and the Remark Books of H.M. ships, to 1884.

As the coast from King George Sound to Eucla road, in the Great Australian bight; and also the western shores of Tasmania have not been surveyed in detail, this work must in the full extent it embraces, be considered incomplete; and doubtless frequent occasion for revision and amendment throughout will present itself.

Hydrographic Office, Admiralty, London.
October 1884.

W. J. L. W.

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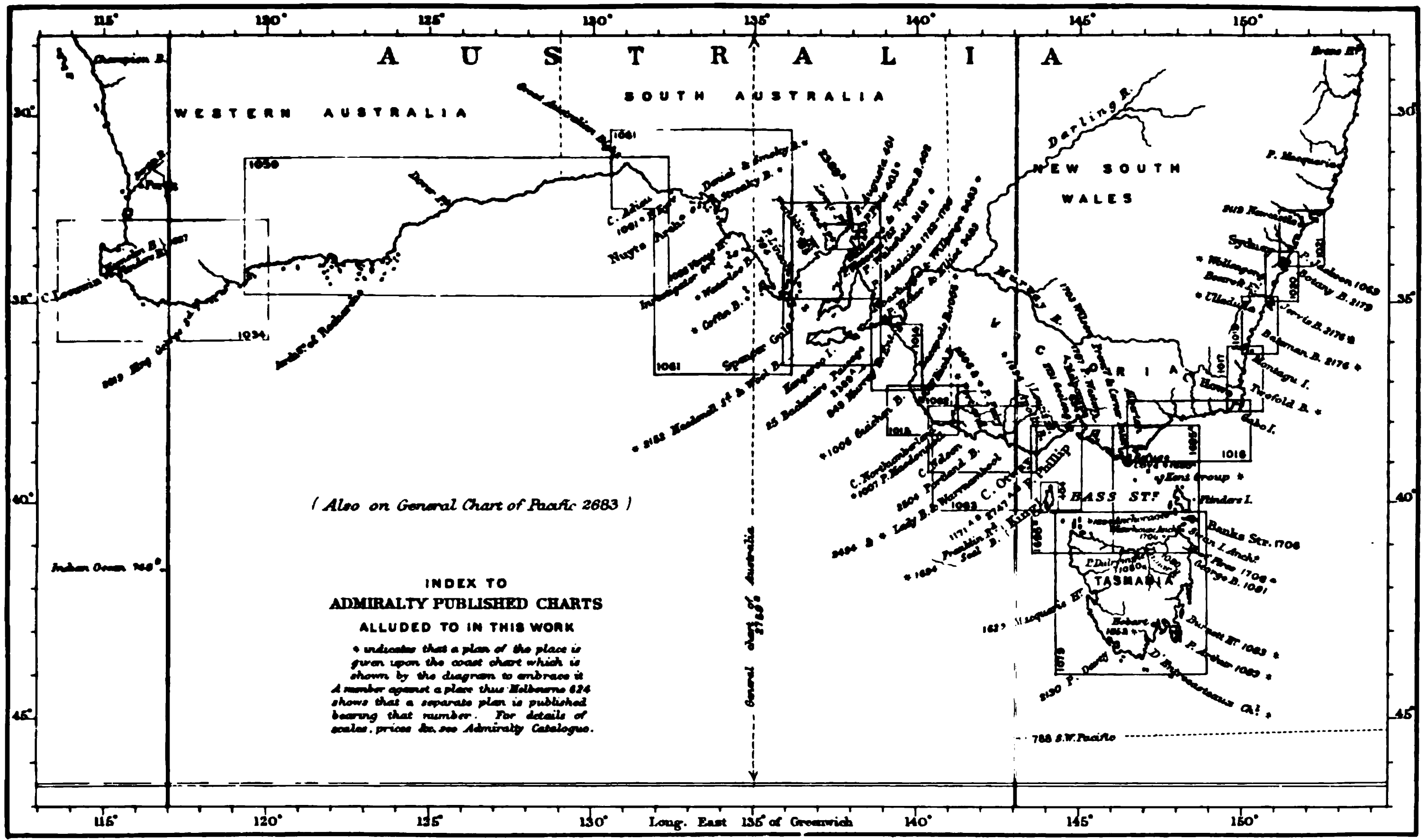
IN THIS WORK THE BEARINGS ARE ALL MAGNETIC, EXCEPT WHERE MARKED AS TRUE.

THE DISTANCES ARE EXPRESSED IN SEA MILES OF 60 TO A DEGREE OF LATITUDE.

A CABLE'S LENGTH IS ASSUMED TO BE EQUAL TO 100 FATHOMS.

THE SOUNDINGS ARE REDUCED TO LOW WATER OF ORDINARY SPRING TIDES.



(Also on General Chart of Pacific 2683)

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ADMIRALTY PUBLISHED CHARTS
ALLUDED TO IN THIS WORK

• indicates that a plan of the place is given upon the coast chart which is shown by the diagram to embrace it. A number against a place thus Melbourne 624 shows that a separate plan is published bearing that number. For details of scales, prices &c. see Admiralty Catalogue.

No. 11 A Australia Directory, Vol. 1 Corrected to Sept. 1884.

Engraved by Davies & Company.

AUSTRALIA DIRECTORY.

VOL. I.

SOUTH AND EAST COASTS, BASS STRAIT, AND TASMANIA.

For later information respecting the lights which are described in this work, seamen should consult the Admiralty list of Lights in South Africa, East Indies, China, Japan, Australia, Tasmania, and New Zealand. This Light list is published early in the current year, corrected to the preceding 31st December.

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still, it has been deemed desirable to retain the directions given in former editions of this work, placing before the navigator the grounds for this decision.

It is true that the distance from the meridian of the cape of Good Hope to Bass strait, or the south coast of Tasmania, is diminished greatly as every succeeding higher parallel of latitude is adopted. For example, the 40th parallel has an advantage over the 38th parallel of 380 miles, or nearly two days' sailing; and again the 45th parallel has an advantage over the 40th to the extent of 650 miles, the 50th over the 45th of 480 miles; and so far, the higher the latitude of the great circle or composite route adopted the more advantageous is the route in point of distance. But the disadvantages attending the selection of any high parallel should be clearly understood by the seaman, and more especially as regards a passenger ship, a small or ill-found vessel, or one deeply laden.

Maury, in advocating the higher parallels of latitude, says :—"In recommending this route, which differs so widely from the favourite route of the Admiralty, I do it, not because it is an approach to the great circle route, but because the winds and the sea and the distance are all such as to make this route the quickest;" and again, "The winds to the north of the 40th parallel of south latitude are much less favourable for Australia than they are to the south of that parallel."

The evidence in favour of these opinions as to the winds and seas being more favourable south of 40° appears, however, by no means conclusive; many experienced navigators are of opinion that north of 40° the steadiness and comparative moderate strength a higher latitude the weather is frequently more boisterous and stormy, and sudden changes of wind, with squally wet weather, are almost constantly to be expected; especially in the winter season, and after passing the islands of St. Paul and Amsterdam. Islands of ice have also been frequently encountered in those regions, and often with fatal results: the greatest number of ice-bergs are seen in November, December, and January, and the smallest number in June and July.*

St. PAUL and AMSTERDAM ISLANDS.—By sighting the islands of St. Paul, or Amsterdam, the error of the chronometers may be corrected, if considered necessary, before approaching the coast of Australia. In clear weather, they may be seen from a ship's deck at the distance of 50 or 60 miles.

St. PAUL ISLAND is 2½ miles long, 1½ miles broad, hilly, attaining an elevation of 862 feet near its centre, which is in lat. 88° 43′ S., long. 77° 34′ W.; the hills are covered with coarse long grass and ferns. On the east side of the island there is an extinct crater, forming a remarkable circular basin which communicates with the sea; at the entrance to the crater there is a depth of 6 feet on the bar at high water springs, and 20 to 28 fathoms inside; outside the bar the water deepens gradually to 5 fathoms at a quarter of a mile distant. Kelp, indicating rocky ground, extends a considerable distance along the east side of the island. A heavy surf beats on the south side of the island.†

Anchorage.—Eastward of the crater entrance and half a mile from the shore there is temporary anchorage in 14 fathoms, with Ninepin rock bearing N.W. by W. 3 cables off, but the bottom is rocky, and this combined with heavy land squalls renders the anchorage unsafe. If steering

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of the winds, combined with the smoother seas and more genial climate, compensate by comfort and security the time presumed to be saved by the shorter route made in the tempestuous gales, the sudden, violent, and fitful shifts of wind, accompanied with hail and snow, and the terrific and irregular seas which have been frequently encountered in the higher parallels adopted.

Independently of the extreme severity of the climate occasionally experienced in high latitudes, there exists the lurking danger of disrupted masses of ice and icebergs of larger dimensions. The absence or approximate positions of these dangers cannot be depended on for any season of the year; they are, however, rarely encountered north of 40° S., except in the vicinity of the cape of Good Hope. Between 40° and 45° S. they have been occasionally met with extending as far as the 65th meridian of E. long., on the 45th parallel as far as 135° E., and on the 50th parallel extending to 140° E.

* *See* Admiralty charts.—Indian ocean, cape of Good Hope to Australia, No. 2,483; scale, $d = 0{\cdot}2$ of an inch; and Tables to facilitate the practice of Great Circle sailing, by J. T. Towson, published at the Hydrographic Office; also Ice chart of Southern Hemisphere, No. 1,241; and Wind and Current charts for the Pacific, Atlantic, and Indian oceans.

† *See* Admiralty chart, St. Paul island, No. 1,921; scale, $m = 3$ inches.

from the northward to the anchorage with the wind fresh from N.W. or N.N.W., much caution is required in anchoring, for the wind veers to the North and N.N.E. off Ninepin rock with heavy gusts which will drive a vessel off the bank of soundings before she can be brought up. North and middle islets should never be shut in behind Ninepin rock.

Winds and Weather.—Westerly winds prevail throughout the year; but during December, January, and February easterly winds are sometimes experienced. During June and September the thermometer falls to 42° Far. and sometimes lower, heavy hailstorms are then frequent, and snow falls occasionally.

Water.—During the winter months an abundant supply of fresh water may be obtained from a pool on the north side of the crater lake: there are several hot sulphurous springs near the same part.

Fish are plentiful. On the island there are a few goats, some wild cats, rats and mice. Early in the month of August penguins land to lay their eggs. St. Paul island is occasionally visited by whaling vessels during the summer months, also by fishermen from Réunion.*

TIDES.—It is high water full and change at 11 h.; springs rise 3 feet. The rate of the stream at springs is about one knot an hour.†

Variation at St. Paul island 23° 15′ W. in 1884.

AMSTERDAM ISLAND,‡ in lat. 37° 49′ S., long. 77° 33′ E., and lying North (*true*) 51 miles from St. Paul island, is about 5 miles long North and South and 4 miles broad, mountainous, volcanic, and attaining an elevation of 2,600 feet. Soundings in 120 and 60 fathoms, black sand, were obtained at about three-quarters of a mile from the east side.§

The mountains on the west side of the island rise precipitously from the sea cliffs facing the west, D'Entrecasteaux head, the south-west extreme, is remarkable, having a peaked top and serrated edges. Abreast of this head the *Pearl* passed through patches of discoloured water, caused either by the débris from the cliffs, or by streams of fresh water that could be seen falling into the sea.

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* Remarks by officers of H.M.S. *Magæra*, June 1871.

† Captain Denham, H.M.S. *Herald*, 1853, draws especial attention to the set of the tidal streams upon the east side of the island, a knowledge of which might be of the greatest importance should a vessel be obliged to claw off shore.

At the outer anchorage in 30 fathoms, with Ninepin rock bearing W.N.W. distant 8 cables, the flood stream sets N.W. from low water to two hours ebb on the shore, or for eight hours; the ebb stream sets S.E. from two hours ebb until low water.

At the inner anchorage in 14 fathoms, with Ninepin rock bearing about N.W. by W. distant 3 cables, the flood stream sets in nearly the opposite direction, or S.S.E. from low to high water, the ebb stream setting N.N.W. from high to low water.

‡ The information on Amsterdam island is chiefly derived from the remarks of Navigating Lieutenant H. Hosken, H.M.S. *Pearl*, Commodore J. G. Goodenough, 1873.

§ *See* Admiralty chart, Amsterdam island, No. 1,945; scale, $m = 1$ inch; Indian ocean, southern portion, No. 748.

The southern portion of the island has abrupt wall-like cliffs at the water's edge, averaging about 60 feet in height. Vlaming head, the south extreme, appears on a S.E. by E. bearing, as a steep bluff.

Heavy rollers were observed to break on the west and south sides of the island, the back-wash extending about 3 cables and giving the appearance of foul ground.

The east side of Amsterdam rises with a gentle slope from the north and south extremes to a mountain, the summit of which appears to be near the centre of the island. From a position eastward several craters of great elevation are visible.

No verdure exists on the west side of the island. On the south side the ground is covered with tufts of long grass. On the north-east side, near the coast, on lower ranges are small stunted trees; the grass is here longer and thicker than to the southward.

Anchorage.—In a small bight at the north-east part of the island there appears to be fair temporary anchorage sheltered from winds between N.N.W. and South. A depth of 10 to 15 fathoms fine dark sand will be found, with the south point of the bight bearing S. ¼ W., Hosken point (north-east extreme) N.W. by N. A dense patch of kelp extends off and to the southward of Hosken point; there is a depth of 7 fathoms amongst the kelp, and 10 to 17 fathoms a ship's length from it.

Landing.—The only landing-place on Amsterdam island is to the southward of Hosken point, near a landslip or break in the cliff, the swell being broken by patches of kelp. In a small indentation of the coast westward of Hosken point there is a fisherman's hut occasionally inhabited; the hut is situated between two points in a hollow near a small beach, at about three-quarters of a mile by land from the landing-place, and would, together with a cave near, afford protection to forty or fifty people in case of necessity.

During the winter months abundance of fresh water runs down the steep cliffs on the southern part of the island, but the water is probably difficult to obtain. Fish of the rock-cod species are plentiful.

Variation at Amsterdam island 22° 30′ W. in 1884.

Caution.—The strong westerly gales and thick weather that are met with near St. Paul and Amsterdam islands in the winter, render caution necessary in approaching them during that season, the colour of the water affording no certain indications of their vicinity, and the seaweed they produce being drifted to leeward in small patches by the prevalent north-easterly current.

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* Landing was safely effected by boat, from H.M.S. *Raleigh*, 1¼ miles southward of the point, in May, 1880. The ship remaining hove to.

WINDS in the INDIAN OCEAN.—To the southward of the region of the south-east trade, the winds are variable. Southward of the parallel of 30° S. the prevailing winds are from S.W. and N.W.; but between the parallels of 40° and 44° S., from the meridian of the cape of Good Hope to Tasmania, strong winds from North and N.N.E. have been frequently encountered, shifting sometimes suddenly to N.W. and westward. Several ships have experienced these northerly winds when steering for Bass strait, which drove them to the south of that route, and obliged them to proceed southward round Tasmania.

The Barometer in the greater part of the Indian ocean generally rises with southerly and falls with northerly winds, although a heavy gale from either quarter may be preceded by a falling barometer, as was observed in H.M.S. *Beagle* between St. Paul and Amsterdam islands and Swan river. On the 1st of November the barometer had gradually risen to 29·90, with fresh winds from North and West; it then fell in two days to 29·34, with strong winds from N.N.W., when, after a heavy gale, the wind veered to the westward, with a rising barometer and finer weather. On the 8th of the same month the barometer was 30·05, with fine weather, and the wind from S.E. by E.; it then fell to 29·80, and there blew a heavy gale from S.E.; after which the weather became more moderate, and the barometer began to rise.*

The Thermometer in the southern hemisphere rises with east, north-east and north winds; with a north-west wind it ceases to rise and begins to fall: it falls with west, south-west, and south winds; and with a south-east wind it ceases to fall and begins to rise.

CURRENTS.—The Indian ocean, like the Atlantic and Pacific oceans, has its equatorial, counter, and variable currents, besides those near the land. One of these, the Agulhas current off the south-east coast of Africa, flows south-westward towards the Agulhas bank; and when to the westward of about lat. 37° S., long. 22° E., it is divided into two branches, one turning N.W. to the cape of Good Hope, and the other eastward into the counter current of the Indian ocean.

This counter current, which is mostly found between the parallels of 37° and 40° or 42° S., is a continuation of that from the Atlantic ocean, combined with the returning branch of the Agulhas current, already mentioned. The counter current, as it runs to the eastward, mingles with the waters of the polar current flowing towards the equator, and sets E.N.E. and N.E. The rate of the counter current is variable, depending upon the winds; in the meridian of cape Agulhas its mean velocity is about 30 miles a day.

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* *See* lines of equal barometric pressure and condensed notes on Admiralty Wind and Current charts.

Off cape Leeuwin the counter or polar current divides into two branches, one flowing north-westward along the west coast, and the other eastward along the south coast of Australia.*

DIRECTIONS.—CAPE of GOOD HOPE to CAPE LEEUWIN.—For a vessel bound to the south coast of Australia, not touching at the cape of Good Hope, the best route is to enter the Indian ocean between the parallels of 37° and 38° S.; or from the cape to steer about South until between those parallels, in order to avoid the north-west current across the Agulhas bank, and to take advantage of the easterly counter current in the Indian ocean.

From about 200 miles southward of the cape of Good Hope, keep between the parallels of 38° and 40° S., sighting the islands of St. Paul or Amsterdam (*see* pages 2, 3), if desirable to verify the longitude before making the land of Australia. It may be here observed that many seamen prefer the route between the parallels of 36° and 37° S., where they say the wind is more steady than in a higher latitude.

After leaving St. Paul and Amsterdam islands, continue eastward on the parallel of about 38° S. to profit by the prevailing westerly winds, until the meridian of cape Leeuwin in 115° E. is reached, and then proceed eastward for either of the Australian colonies, as directed in Chapter IX.

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* For winds and currents on the southern coasts of Australia, see page 8; also Chapter IX.

CHAPTER I.

AUSTRALIA.—SOUTH COAST, CAPE LEEUWIN TO CAPE CATASTROPHE.

VARIATION IN 1884.

Cape Leeuwin - 5° 25′ W. | Cape Catastrophe - 3° 55′ E.

THE south-west coast being that part of Australia which is generally approached by ships navigating to the southern colonies of Australia from most countries in the world, Vol. I. of this work commences at cape Leeuwin with a description of the South coast; and proceeding towards Tasmania and Bass strait, conducts the navigator along the East coast to Sydney; from whence Vol. II. describes the remaining portion of the East coast, the Coral sea, the southern coast of New Guinea and Torres strait; and Vol. III. completes this fifth division of the globe by describing the North and Western coasts from Torres strait to the spot from which these directions commence.

CAPE LEEUWIN (Lioness),* the south-west extremity of Australia, was so named by the captain of the Dutch ship *Leeuwin* in 1622. The cape is in lat. 34° 22′ S., long. 115° 9′ E.

The cape is a small round head 43 feet high, fronted with reefs, and joined to the mainland by a low swampy neck, whence (one third of a mile from the cape) the land rises abruptly 480 feet and continues with a few breaks to beyond cape Hamelin which bears N.W. by N. 9 miles from cape Leeuwin. It is of smooth but sterile aspect, and is visible 30 miles in fine weather. On the coast, at 3½ miles North of cape Hamelin there is a conspicuous sand-patch.

The coast between capes Hamelin and Leeuwin is fronted by numerous sunken reefs and rocky islets, the largest of which, named Cumberland rock, 33 feet high, and of a dark colour, lies S. by E. 5 miles from cape Hamelin and N.W. ½ W. 4½ miles from cape Leeuwin; at about 1¼ miles S.W. by W. from this rock, lies a reef on which the sea breaks only during a heavy swell.

Landmark.—The beacon erected for surveying purposes, in 1878, on the summit of the coast hills about a mile northward of the pitch of cape Leeuwin, is a good mark.

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* *See* Admiralty charts of Australia: General chart, southern portion, No. 2,759 b; scale, *d* = 1 inch; and South coast, sheet 1, cape Leeuwin to cape Arid, with King George sound, No. 1,059; scale, *m* = 0·08 of an inch.

Approaching the Coast between cape Leeuwin and cape Naturaliste during the day, in clear weather vessels may stand into 30 fathoms, coarse sand mixed with shells and small stones; by night or in thick weather, the water should not be shoaled less than 60 fathoms, and upon obtaining that depth, a steam vessel should, if bound to the eastward, steer South until the water deepens to over 100 fathoms. Thence she may steer S.E. by E. keeping in soundings of from 60 to 70 fathoms until eastward of White Topped rocks, or her position be otherwise verified.

The approach to cape Leeuwin does not seem to be marked by the usual indications of the proximity of land, the water retaining its colour, without any sea-weed at its surface, or a greater number of oceanic birds than are generally met with in the run from St. Paul island.

CURRENTS.—The Polar current divides off cape Leeuwin, one part setting northward along the west coast, and the other part eastward along the south coast at the rate of one to 1½ knots an hour, the rate of the latter part is retarded during easterly winds which prevail from the middle of January to the middle of April; during southerly and south-westerly gales the current sets towards the land.*

In the offing between cape Leeuwin and cape Otway the currents appear to be mainly influenced by the prevailing winds, which are strong westerly during nine months of the year. Except during easterly winds, vessels approaching the western entrance of Bass strait will experience a current setting to the south-east at rates ranging from a half to 2½ knots an hour, according to the strength and duration of the westerly winds.†

SOUNDINGS.—The 100 fathoms edge of the coast soundings will be found about 34 miles south of cape Leeuwin, about 27 miles west of that cape, and 24 miles westward of cape Naturaliste. A depth of 25 fathoms is found close west of Naturaliste reefs, and of the inshore reefs off cape Naturaliste and cape Leeuwin.

GÉOGRAPHE REEF on which the sea breaks constantly during bad weather, but only at uncertain intervals in moderate weather, lies S.W. 3¾ miles from cape Hamelin, and N.W. by W. ½ W. about 8 miles from cape Leeuwin, this reef consists of two small rocks about one cable apart in a N.W. and S.E. direction, with shallow water over them,

and deep water between. St. Alouran island well open south of cape Leeuwin bearing S.E. by E. ¾ E. leads south; and a conspicuous sand-patch north of cape Hamelin N.E. ½ N. leads west of Géographe reef. The soundings give little warning of its vicinity, the depth being 24 fathoms at one-sixth of a mile from its north-west and south-west sides.

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* Northward of cape Leeuwin during the months of January and February, a strong current has been experienced setting to the eastward, H.M.S. *Brisk* in one night being set 20 miles E.N.E. between cape Naturaliste and Swan river.

† On the 23rd July 1883, a bottle which had been thrown overboard on the 7th October 1881 from the ship *Timaru* of Glasgow, in lat. 43° 46′ S., long. 83° 14′ E., was picked up 7 miles west of Eucla in the Great Australian bight, having drifted 2,270 miles in 654 days, or at the average rate of 3·4 miles in 24 hours.

Rambler Rocks, a small cluster even with the water's edge, said to have been seen by the *Rambler*, merchant vessel, lying W.S.W. 12 or 15 miles from the remarkable bare sand-patch, north of cape Hamelin, could not be found when sought for by H.M.S. *Beagle*, and recently, during a careful examination, the Colonial Government surveying schooner *Meda* sounded over and around the reported position of the Rambler rocks, obtaining depths of 28 and 30 fathoms; thence, soundings of 25 to 23 fathoms, over sand and shells, were found, in traversing towards Géographe reef. From this evidence and from the fact that a small coasting steam vessel having passed around cape Leeuwin twice a month for a period of four years, without seeing any indication of these rocks, they are supposed to be identical with Géographe reef, and have been removed from the Admiralty chart.

Beaver Reef, was first reported in 1864 to be in lat. 32° 6′ S., long. 114° 37′ E., and again in 1869, at about 11 miles west of that position, and as extending about half a mile north and south, with depths of 15 to 18 fathoms at a quarter of a mile from its southern end. After a careful examination made at different times and continued for several days in the Colonial Government schooner *Meda*, by Staff Commanders Archdeacon and Coghlan over an area included between lat. 32° S. and 32° 20′ S., and long. 114° E. and 115° E., when soundings with no bottom at 360 to 300 fathoms were obtained at the positions given and no bottom at 850 fathoms between, the non-existence of the reef is considered to be established; it has therefore been removed from the Admiralty charts.

HAMELIN BAY, on the north side of White Cliff point, has since 1878 risen into some importance in connection with the shipment of timber. A jetty 500 feet in length, with a tramway, has been constructed in the southern part of the bay. Communication exists with Busselton and Flinders bay by overland mail, weekly, and fresh meat, vegetables, and water in moderate quantities can usually be obtained.*

Anchorage.—The bay is exposed to the north-west, from which quarter gales are experienced at all seasons, and a heavy swell is thrown in.

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* *See* Admiralty plan of Hamelin bay, No. 1,037; scale, m = 1·87 of an inch; also Australia Directory, Vol. III.

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The approach to cape Leeuwin does not seem to be marked by the usual indications of the proximity of land, the water retaining its colour, without any sea-weed at its surface, or a greater number of oceanic birds than are generally met with in the run from St. Paul island.

CURRENTS.—The Polar current divides off cape Leeuwin, one part setting northward along the west coast, and the other part eastward along the south coast at the rate of one to 1½ knots an hour, the rate of the latter part is retarded during easterly winds which prevail from the middle of January to the middle of April; during southerly and south-westerly gales the current sets towards the land.*

In the offing between cape Leeuwin and cape Otway the currents appear to be mainly influenced by the prevailing winds, which are strong westerly during nine months of the year. Except during easterly winds, vessels approaching the western entrance of Bass strait will experience a current setting to the south-east at rates ranging from a half to 2½ knots an hour, according to the strength and duration of the westerly winds.†

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Anchorage.—The bay is exposed to the north-west, from which quarter gales are experienced at all seasons, and a heavy swell is thrown in.

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Approaching the Coast between cape Leeuwin and cape Naturaliste during the day, in clear weather vessels may stand into 30 fathoms, coarse sand mixed with shells and small stones; by night or in thick weather, the water should not be shoaled less than 60 fathoms, and upon obtaining that depth, a steam vessel should, if bound to the eastward, steer South until the water deepens to over 100 fathoms. Thence she may steer S.E. by E. keeping in soundings of from 60 to 70 fathoms until eastward of White Topped rocks, or her position be otherwise verified.

The approach to cape Leeuwin does not seem to be marked by the usual indications of the proximity of land, the water retaining its colour, without any sea-weed at its surface, or a greater number of oceanic birds than are generally met with in the run from St. Paul island.

CURRENTS.—The Polar current divides off cape Leeuwin, one part setting northward along the west coast, and the other part eastward along the south coast at the rate of one to 1½ knots an hour, the rate of the latter part is retarded during easterly winds which prevail from the middle of January to the middle of April; during southerly and south-westerly gales the current sets towards the land.*

In the offing between cape Leeuwin and cape Otway the currents appear to be mainly influenced by the prevailing winds, which are strong westerly during nine months of the year. Except during easterly winds, vessels approaching the western entrance of Bass strait will experience a current setting to the south-east at rates ranging from a half to 2½ knots an hour, according to the strength and duration of the westerly winds.†

SOUNDINGS.—The 100 fathoms edge of the coast soundings will be found about 34 miles south of cape Leeuwin, about 27 miles west of that cape, and 24 miles westward of cape Naturaliste. A depth of 25 fathoms is found close west of Naturaliste reefs, and of the inshore reefs off cape Naturaliste and cape Leeuwin.

GÉOGRAPHE REEF on which the sea breaks constantly during bad weather, but only at uncertain intervals in moderate weather, lies S.W. 3¾ miles from cape Hamelin, and N.W. by W. ¼ W. about 8 miles from cape Leeuwin, this reef consists of two small rocks about one cable apart in a N.W. and S.E. direction, with shallow water over them,

and deep water between. St. Alouran island well open south of cape Leeuwin bearing S.E. by E. ¾ E. leads south; and a conspicuous sand-patch north of cape Hamelin N.E. ½ N. leads west of Géographe reef. The soundings give little warning of its vicinity, the depth being 24 fathoms at one-sixth of a mile from its north-west and south-west sides.

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Vessels should moor with open hawse to north-west or ride at single anchor with a long scope of cable. From the beginning of May until the beginning of November, upon the usual indications of a north-west gale (falling barometer 29·80, with strong land winds between east and north-east), vessels are advised to put to sea and seek shelter in Flinders bay until the gale is over. Having regard to the severity of the gales at that season, and the possibility of accident from the nature of the holding ground, the delay and inconvenience occasioned would be compensated by the assured safety of the vessel.

The *Meda* found considerable swell with southerly winds in the usual anchorage, but obtained smoother water by shifting berth 2½ cables to the south-eastward, in 5 fathoms with east extreme of Peak islet bearing S.W. by W. ½ W., and Mushroom rock S. ¾ W.

Directions.—Vessels from the southward, after passing cape Leeuwin and Géographe reef, should steer to the northward until the south end of Boranup sand-patch bears E. by S., which will lead between Edith ledge and Grace rock. As the entrance is approached Edith ledge will be easily recognised, pass the ledge at 1½ or 2 cables distance, and when to the eastward of it steer about S.E. for the anchorage in 6 fathoms water, with Edith ledge bearing N.W. by W. ½ W., and highest point of Hamelin island seen over Peak island S.W. by S.

From the northward Freycinet point should not be approached within a mile, and when the middle of Boranup sand-patch bears East, steer to pass Edith ledge about 2 cables distant, and proceed as before directed.

ST. ALOUARN ISLETS.—These rocky islets and reefs form a chain extending nearly 5 miles in a south-easterly direction from cape Leeuwin.

Seal islet, 29 feet high, the north-westernmost of St. Alouarn islets, lies one mile E. by S. ½ S. from cape Leeuwin; between this islet and the mainland there are numerous dry docks and sunken reefs.

St. Alouarn islet, 86 feet high, is the largest islet, and lies S.E. by E. 3½ miles from cape Leeuwin.

Flinders islet, 20 feet high, lies S.S.E. three-quarters of a mile from St. Alouarn islet; at half a mile S.E. from Flinders islet lie two rocks (South-east rocks) 15 feet high, near each other; these rocks present a bluff face to the south-west, and slope to a point in a north-east direction. A small sunken rock lies about one cable east of South-east rocks.

S.W. Breaker lies S.W. by W. 1¼ miles from South-east rocks, and S.S.E. 4¾ miles from cape Leeuwin. The high land of cape Hamelin, seen well open west of cape Leeuwin, bearing N.N.W., leads to the westward;

and a remarkable dome-shaped, dark hill, near the coast about 9½ miles east of Blackwood river, N.E. ¼ N. leads to the south-east of S.W. breaker.*

FLINDERS BAY.—The coast from cape Leeuwin trends E.N.E. 1¼ miles to Matthew point, the west point of Flinders bay; N. by E. 2½ miles to the mouth of Blackwood river (Hardy inlet); thence to the eastward for about 8 miles, when it gradually curves to the south-east 11½ miles to Black point, the east point of the bay. The coast from the mouth of Blackwood river for a distance of 9 miles to the eastward is comparatively low and sandy; the land then becomes higher with several sand-patches on its slopes for a distance of 7 miles to White point, so named from the long white sand-patch at its extremity; several reefs some of which dry at low water, extend half a mile from White point.

Black point, 140 feet high, situated S.E. 4 miles from White point, is composed of dark, basaltic rock, projecting abruptly from the coast, and forming a bight on either side, both of which are foul; Black point is easily recognised, the coast for several miles east and west being sandy. Dickson peak, 485 feet high, is a dark conspicuous hill, N.W. 2 miles from Black point.

Flinders bay being exposed to the south-east, from which quarter strong gales sometimes blow during the summer, sending in a heavy ground swell, should not be entered at that season; the north-west side of the bay is rocky; but there is a good winter anchorage off the mouth of Blackwood river, protected from northerly and westerly winds by the mainland and from southerly winds by Alouarn islets and reefs.

In the north part of the bay at 1¼ miles from the shore and E. ¾ S. 4 miles from the mouth of Blackwood river, lies Bessie reef, on which the sea breaks in bad weather; the neighbouring shore is fronted with small rocky ledges, some of which are visible at low water.

Augusta was formerly a small settlement on the west side of the entrance to Blackwood river: in 1877 there were only a few poor settlers, who obtain a precarious living by fishing.

Landing can be effected with tolerable safety within a small rocky ledge, which extends half a cable in a northerly direction from Barrack point (a small projection midway between Matthew point and Blackwood river), except during bad weather; near this landing place there is a small stream of fresh water.

Blackwood river.—The bar at the mouth of this river is rocky and has a depth of 3½ feet water, except in winter, when the freshets from the river deepen it to 6 or 7 feet, independently of a rise of 3 feet more occasionally, caused by north-west gales. The channel over the bar is tolerably well defined, but as there is a constant surf, boats should not attempt to cross it without local knowledge. Fishermen residing in this neighbourhood are available as pilots.

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* *See* Admiralty plan of Flinders bay, No. 1,037; scale m = 1·8 of an inch.

Supplies.—Good fresh water may be obtained from the stream near Barrack point; firewood is plentiful, but provisions cannot be procured.

Tides.—It is high water, full and change, in Flinders bay at 10 h. 35 m.; springs rise 2¾ feet, neaps 2 feet; during the winter, and with north-westerly gales the water rises 4 to 5 feet—this rise generally indicates the approach of these gales.

The COAST from Black point trends in a south-east direction 34 miles to D'Entrecasteaux point; at 7 miles south-east from Black point is Donelly river, 10 miles south-east of which is Warren river; the mouths of these rivers are closed, except during winter and after heavy freshets. The coast a short distance east of Warren river is composed of dark bushy-topped sand-hills 700 to 800 feet high, with swamp extending from their base to the beach.

From Warren river the low sandy beach becomes nearly a mile in width; at 4½ miles south-east of this river is Meerup brook, which runs some few miles inland, the beach through which it percolates into the sea is quicksand, and can only be crossed by keeping on the edge of the surf. These quicksands occur at the mouths of most of the rivers along this coast. At 9½ miles south-east of Warren river, the high coast ridges suddenly terminate in a bare sand-topped hill 550 feet high, from which the coast is comparatively low and rocky to Black head, one mile S.E. of which is a small brook running through a bare sand-patch of moderate height. At the S.E. end of this patch high rocky sandstone cliffs commence and continue to about half a mile beyond D'Entrecasteaux point, (with the exception of a small break 1½ miles north of the point), when the land becomes low and grassy.

D'ENTRECASTEAUX POINT composed of reddish perpendicular cliffs about 400 feet high, is one of the most remarkable projections on this part of the coast. At 6 miles N.E. of this point is a remarkable granite hill, 685 feet high, named Chomdalup, rising abruptly from a low swamp.

Flat island, 8 feet high, with several dry rocks around it, is of small extent, and lies half a mile S.W. from D'Entrecasteaux point.

South-west reefs, situated S. by W. ¼ W. 3½ miles from D'Entrecasteaux point, consist of three reefs half a mile from each other, in a

N. by W. and S. by E. direction; the northernmost two reefs are about 300 yards in diameter, and nearly awash, the southern reef is smaller with more water over it, and does not break regularly.

Sandy Island, 30 feet high, S.E. 2½ miles from D'Entrecasteaux point, is one-third of a mile long, E.S.E. and W.N.W., and 300 yards broad, from it several small ledges and sunken rocks extend. Between the island and the shore there are also several reefs, some of which are awash, and in heavy weather this locality appears a mass of breakers. At 2 miles S.E. of Sandy island there is a heavy breaker, 2 miles East of which (abreast Gardner river) there is another breaker. Between these breakers and the shore lie several small reefs.

Sandy island affords good shelter for coasting vessels, and is said to yield fresh water by digging in the sand. The anchorage must, however, be approached with caution on account of the reefs in its vicinity.

The COAST between D'Entrecasteaux point, and Gardner river at 6¾ miles E. by S. ¾ S. from it, is low, and fronted with a sandy beach, off which are numerous rocky patches. Behind the beach are low grassy ridges and swamps extending some miles inland, with here and there clumps of trees.

Gardner river, flows into the sea over a narrow rocky bar, generally with great strength, except in very dry seasons, when it may be forded at the mouth, off which are several dry ledges and sunken rocks. At 8½ miles S.E. by E. ½ E. from Gardner river is West Cliff point, having between a small projection fronted by some rocks.

West Cliff point, 140 feet high, is the first cliff to the eastward of D'Entrecasteaux point, whence high and precipitous cliffs continue S.E. ½ E. 12 miles to Cliffy head. At three-quarters of a mile W.S.W. from West Cliff point there is a sunken rock on which the sea breaks at times; there are other rocks and ledges nearer the shore.

White-topped rocks, situated S.W. by S. 7½ miles from West cliff point, consist of two rocks, the higher and western rock 109 feet high, is about 200 yards long N.W. and S.E., and 100 yards broad, having a jagged top whitened by guano deposit. The smaller rock 40 feet high, about a cable east of the larger has a flattened top and is of dark appearance. The soundings give no indication of approach to these rocks as they are steep-to.

Brookes inlet, situated 4½ miles East of West cliff point, is 8 miles long N.W. and S.E. and 1½ to 2½ miles wide, with several small islands near its east and west ends; the entrance, half a mile wide, is generally closed by a broad bar of sand; within this bar a channel a quarter of a mile wide runs about E. by S. 2 miles to the south-west corner of the inlet.

Brookes reefs, off the mouth of Brookes inlet, occupy a space nearly 2 miles in extent at 1¼ to 2 miles from the shore. The outer reef lies S.W. by W. ¼ W. 2¼ miles from the mouth of the inlet; the shoalest reef on which the sea constantly breaks lies W. by S. 1¾ miles from the inlet. The extreme of Nuyts point seen just open north of Chatham island leads to the southward of Brookes reefs.

Cliffy head and Chatham isle.—From Brookes inlet the coast trends S.E. ¼ E. 7 miles to Cliffy head, the hills gradually rising to a height of 815 feet at a mile West of the head.

At half a mile South of Cliffy head lies Chatham isle 610 feet high having a few scrubby bushes near its summit. The south end of this isle (its highest point) rises perpendicular from the sea, with a steep slope towards the north, and when seen from the east or west has a wedge-shaped appearance. West 1¼ cables from the isle lies a rock 90 feet high, one third of a mile long N.N.E. and S.S.W., and 100 yards broad with a small rock off its north end. One mile W.N.W. from the highest point of Chatham isle is a rock awash. The channel between Chatham isle and Cliffy head is apparently clear.

The COAST from Cliffy head trends N.E. about 2 miles, thence S.E. 2 miles to Long point, a narrow cliffy projection 140 feet high and one-third of a mile long. At the head of the bight thus formed is a conspicuous sand-patch, thence the coast rises into high cliffs, continuing nearly to Long point, about one mile from which is a remarkable round green hill, rising abruptly on its eastern side from a narrow gully. East of this gully the high cliffs continue to a mile beyond Nuyts point.

NUYTS POINT, 367 feet high, situated 3 miles S.E. by E. from Long point, extends three-quarters of a mile from the coast line, and forms a bight on either side. From Nuyts point the shore trends E. by N. ¼ N. 3¾ miles, thence S.E. to a dark cliffy head. At 1¼ miles East from Nuyts point and a quarter of a mile off shore is Black rock 70 feet high, and half a mile further east is a remarkable mass of granite boulders on the summit of a ridge 680 feet high, which rises abruptly from the shore. One mile West of the dark head above mentioned is a narrow sandy beach backed by a steep sand cliff.

Saddle isle, 150 feet high, named from its resemblance to a saddle with distended flaps, lies East 5 miles from Nuyts point.

Saddle isle has some outlying rocks, (which are generally visible,) at about half a cable from its south-east end. Off its north-west side lies a black rock 20 feet high and about 300 yards long north and south, having ledges and foul ground, extending about halfway across to the mainland, and nearly joining Snake ledge, which extends in a north-east direction to within a short distance of Rocky head.

Fresh water is abundant on Saddle isle.

Goose isle, 150 feet high, lies E. by S. 5 miles from Nuyts point. There are two sunken rocks on which the sea generally breaks, at 2 cables from the east and at 2 cables from the west end of Goose isle. At three-quarters of a mile S.W. by W. $\frac{1}{2}$ W. from this isle is a ledge about 4 feet above water, on which the sea constantly breaks.

Between Saddle and Goose isles there is a clear channel.

Rocky head, 80 feet high, lies N.N.E. one mile from Saddle isle, and is the western head of a bay nearly 2 miles deep. In the western corner of this bay is the entrance to Nornalup inlet.

Nornalup inlet, the north and western sides of which are thickly wooded, is 3 miles long and 1½ miles wide, having two rivers flowing into it. Dup river on its north and Gordon river on its eastern side; there are also two small streams running into its western side. Dup river is navigable for about 2 miles, and Gordon river 5 to 6 miles; the banks of these rivers are covered with the finest timber for naval purposes. The entrance to Nornalup inlet is a little over a cable wide between the heads, the southern head being high and rocky, the northern low and sandy. A long sandy spit extends from the northern nearly across to the southern head, leaving but a narrow channel close to the shore. The entrance is close round the southern head, between it and a patch of rocks about 100 feet distant. Passing these rocks, the channel deepens and continues along the south shore for about one third of a mile into the inlet; extensive sand banks accumulate in the last bend, through which are several small streams. In January 1877 there was not more than 4 feet water in the entrance, but during the winter months, after heavy and continuous rains, the rush of water deepens the channel, and as much as 12 feet is said to have been found, it is, however, always attended with danger even to boats, on account of the heavy swell which constantly rolls into the bay, even during light winds and the finest weather. This must especially be the case during the months of January, February, and March, when strong S.E. winds sometimes blow on this coast.

Nornalup inlet abounds in fish and water fowl, among the latter being the black swan. Emu and kangaroo are also plentiful on the south side of the inlet.

Fresh water may be found by digging near the shores of Nornalup inlet.

The COAST from the mouth of Nornalup inlet, gradually curves to the eastward for 4 miles to a rocky bluff. The first 3 miles is composed of sandy hillocks 150 to 200 feet high, then for about a mile they rise to 320 feet, and are faced with overhanging cliffs; off the east end of these cliffs, at about a cable from the shore, lies a ledge of rocks awash. Abreast the middle of these cliffs three-quarters of a mile from the shore, and East 2 miles from Rocky head, is a rock on which the sea breaks with a heavy swell. Off the above rocky bluff are some ledges of rocks extending two cables from the shore, and at three-quarters of a mile to the eastward is a deep bight on the north-west side of which are two small streams of fresh water. On the north-east side of the bight there is a high sand-patch out of which a small stream runs; from the south-west corner of this sand-patch the land rises abruptly to a height of 550 feet, the seaward side being perpendicular dark cliffs, sloping gradually to the N.E.

Midway between the sand-patch and Rame head, is a small green headland 146 feet high, having some sunken rocks a quarter of a mile off it, between which and Rame head is a large dry ledge.

RAME HEAD, 410 feet high, situated E. by S. ½ S. 5½ miles from Rocky head, is sharp and perpendicular, having a high rock close to; at a quarter of a mile S. by E. from the head are two rocks above water, with some sunken rocks off their south-west and south-east sides, nearly a mile from the shore.

Between Nuyts point and Rame head are three remarkable peaks named Sugar-loaf, Rugged, and Caldyanup, each nearly 1,400 feet high, lying in a N.N.W. and S.S.E. direction, Caldyanup, the south-eastern peak being N.E. by N. 16 miles from Nuyts point and N. by W. 14 miles from Rame head. At 3 miles East of Caldyanup, there is a detached ridge 4 miles long E. by S. and W. by N. having several peaks, the highest 1,339 feet high, being near its western end.

The COAST from Rame head trends E. by S. ½ S. 3 miles to Irwin point. Eastward of the head the cliffs gradually descend to a small green hilly projection at three-quarters of a mile distant, off which are some rocks. East of this projection is a sandy bight, three-quarters of a mile wide, backed by high cliffs terminating in a point having a rock 20 feet high on it. From this rock to Irwin point the shore is rocky, with a sand-patch near the middle.

From Irwin point, which is 170 feet high, steep and cliffy, the land is low, and trends 3 miles N.N.E. to the mouth of Irwin inlet, and at a mile from the point is a bare sand-patch conspicuous from the eastward.

Irwin inlet is about 2½ miles long in a N.E. and S.W. direction, and upwards of a mile wide; its mouth is seldom altogether closed, but it is too shallow for a boat to enter, except, perhaps, immediately after a heavy freshet. Notwithstanding the shallowness over the bar, it is dangerous to ford in consequence of the quicksands.

On the east side of the entrance is a bushy-topped hill 370 feet high, fronting which is a bare sand-patch.

The COAST from Irwin inlet trends S.E. by E. 3 miles, to a small dark round head, three-quarters of a mile west of which is a conspicuous green peak rising abruptly from the beach to a height of 320 feet. The bight between Irwin point and the round head, named Foul bay, is full of reefs and sunken rocks, and in bad weather the whole bay for a distance of over 2 miles from the shore is a mass of breakers.

From the round head (which has a dry ledge off its east point) the shore trends to the northward three-quarters of a mile, thence 2 miles E.S.E. to a small dark head about 160 feet high with some rocks half a cable off its south-east extreme, on its eastern side is a small rocky opening named Boat harbour, about half a cable wide and 2 cables deep, with rocks extending nearly half a mile from the north entrance point; the entrance is safe for boats in moderate weather; at the head of the harbour there is a small sandy beach where landing might be effected.

The swampy flats in this vicinity extend to the beach, forming a break in the coast ridges a mile wide. From this break the coast becomes precipitous, the grassy coast ridges gradually increasing in height to Hillier point, when they attain a height of 530 feet.

About a mile East of Boat harbour and half a cable from the shore, lies a small islet 120 feet high, with outlying rocks between it and Hillier point extending nearly a mile from the coast.

Hillier point, 440 feet high, situated East 11 miles from Irwin point, is a narrow projection with a cliffy face and flat top, thence the land abruptly rises to an elevation of 532 feet.

Stanley islet 160 feet high, lies one cable South of Hillier point, having its summit covered with coarse grass; off its south side is a rock, and off its north-west side a ledge, between which and the point there is a clear passage.

At three-quarters of a mile E. by S. from Stanley islet a heavy swell was observed, which would doubtless break during bad weather. At 5 or 6 miles off this part of the coast there are 30 to 40 fathoms water.

William bay, the bight between Hillier point, and Edward point E. by N. ¾ N. 5 miles from it, is about 2 miles deep with numerous sunken rocks, and having at its eastern side small dry ledges.

Parry inlet, the mouth of which is generally closed, lies 2 miles North of Hillier point, and extends 2 miles in a north-westerly direction. Kangaroo, wild duck, and black swan are plentiful on this inlet.

Edward point is low, rocky, and fronted by small rocky ledges; at half a mile North of the point is a green ridge 500 feet high, on which are several large granite boulders.

The COAST from Edward point is rocky and fronted by ledges for about 1½ miles in an E.N.E. direction to two small streams which run into the sea. Thence the shore trends S.E. by E. 3 miles to Wilson head, a broad cliffy projection 400 feet high.

Two miles N.N.W. of Wilson head rises a dark wooded peak 1,047 feet high, it is the southern peak of an irregular and broken range named Bennett Range, which extends in a northerly direction and terminates at mount Lindesay 1,469 feet high, from which a long spur extends to the eastward. This mount is 12½ miles North from Wilson head, and is conspicuous from seaward.

From Wilson head the shore trends in a northerly direction 1½ miles to the mouth of Wilson inlet, thence S.E. by E. ½ E. 8 miles to Knapps head.

Ratcliffe bay, into which Wilson inlet empties itself, has on the north and east sides several sunken rocks. This bay appears shallow for a considerable distance seaward, and a heavy rolling swell is generally setting into it.

A little to the eastward of the mouth of Wilson inlet are two sand drifts, thence the coast rapidly rises to a height of 500 feet and upwards, with a perpendicular cliffy front, which continues 7 miles in an E.S.E. direction to Knapps head. Against this coast a heavy surf is constantly rolling.

One mile and a half north-west of Knapps head and one third of a mile off shore is a sunken rock, on which the sea always breaks.

Wilson inlet, the entrance to which (generally blocked with sand), is half a mile wide, is over 8 miles long and 1½ to 3 miles broad. Several streams run into it, the principal being the Hay on the north-east and the Denmark on the north-west side.

The only habitation near the coast between cape Leeuwin and King George sound is a small farm and cattle station on the south-east side of Wilson inlet. Fish and wild fowl are plentiful.

Knapps head, 400 feet high, is conspicuous and presents to seaward a cliff front; three-quarters of a mile northward of this head grassy ridges rise to an elevation of 600 feet, sloping rapidly to the swampy ground one to 1½ miles inland.

The COAST from Knapps head trends N.E. by E. 2 miles to a small sandy beach; from which the coast abruptly rises, and extends S.E. by E. 7 miles to West cape Howe; the first 2 miles of this distance is fronted by high cliffs, thence for a mile is a low sandy ridge, which rises to a flat-topped hill 864 feet high; this hill slopes suddenly on its south-east side to a valley extending in a north-east direction, having at its head a lagoon of fresh water.

WEST CAPE HOWE, situated E. by S. ½ S. 23 miles from Hillier point, is the westernmost of three bluff headlands, each 300 feet high and steep. Northward of the cape the ridges of hills rises suddenly, to a height of 900 feet.

Torbay head, the easternmost of the three bluff headlands, has a round dark, scrubby top.

Tides.—No regular tides occur in the vicinity of West cape Howe, and the rise seldom exceeds 2 feet, except during north-west and westerly gales, when the rise is affected as on other parts of the coast.

Soundings at 5 or 6 miles South of West cape Howe are 40 to 42 fathoms.

TORBAY, which includes ports Harding and Hughes, extends from Torbay head E. ½ N. 7½ miles to Stoney islet, and is 4 miles deep; but it is too much exposed to the south-east to afford secure anchorage, although the islets and reefs in the bay give shelter to coasting vessels. From Torbay head the coast trends N.E. ½ N. 3 miles to Forsyth bluff, forming a bight about three-quarters of a mile deep, in which there are three sandy beaches. Seagull isle, 65 feet high, lying E.N.E. 1½ miles from Forsyth bluff, is small and rocky, but conspicuous, with a reef partly dry extending three-quarters of a mile from its west and south-west sides, and a sunken reef near its south-east point.

Port Harding.—At 1½ miles West from Seagull isle there is good shelter for coasting vessels, in port Harding, formed by Migo and Richard isles, which lie about a cable from the shore, with 1½ to 3 fathoms water between. Several dry and covered reefs extend half a mile north-east and northward from Migo isle, which is the northern of the two; and between these reefs a 5-fathoms channel leads in a south-west direction towards the best sheltered anchorage, in 3 fathoms, except close on the north side of a small bare rock that fronts a sandy beach abreast Migo isle; for larger vessels, there is anchorage in 5 fathoms, sandy bottom, at one-third of a mile North from Migo isle, but the space is limited and surrounded by reefs and 3-fathoms patches. The approach to these anchorages is intricate and should not be attempted without local knowledge.

Anchorage may also be obtained in 5 fathoms, sand and rock, but with less shelter about three-quarters of a mile north-westward of Seagull isle, with

Migo isle bearing S.W. by W. ½ W. distant nearly a mile. The approach to this anchorage is round the north side of Seagull isle, which on its eastern and northern sides may be passed at a cable distance. The shore abreast Migo isle is low and gradually curves to the north-east 2 miles to port Hughes.

Torbay inlet.—Inshore north-westward of Torbay are extensive swamps, and several high wooded ridges. At 2 miles north-east of Migo isle is the mouth of Torbay inlet, generally blocked with sand, it is however broken through occasionally, forming a deep and rapid channel.

The inlet is not of great extent, but numerous streams and swamps drain into it, the chain of swamps extending (at a distance of one or 2 miles from the coast) to the western shore of Princess Royal harbour.

Port Hughes, formed by Shelter isle and the mainland, is merely a boat harbour sheltered on its eastern side by several dry ledges.

The entrance to port Hughes is close round the north-west side of Shelter isle and is not more than 10 or 15 yards wide, with a spit extending from the northern shore nearly across to the island.

At 1½ cables from the south-west side of Shelter isle lies a sunken rock, on which the sea breaks with a moderate swell; the south-east and south sides are also foul to about the same distance.

Water, at the north end of the beach, good water is to be found at all seasons of the year.

The COAST.—From the mouth of Torbay inlet the land rises, and at three-quarters of a mile north-east from Shelter isle attains a height of 470 feet.

From Shelter isle the coast trends N.E. about three-quarters of a mile, with an elevation of nearly 400 feet, thence E.S.E. 9 miles to Sharp point, 540 feet high. At half a mile S. by W. from Sharp point, lie Green islands, the eastern island is 210 feet high, and nearly a quarter of a mile in diameter; the western island is a cable distant from the eastern, it is 134 feet high and about 200 yards in diameter; at one cable W.N.W. of this islet is a black ledge 20 feet high, having a small rock near its south-west side. Green islands are not so smooth as Stony island, and appear to be composed of large boulders with several fissures in them.

There is a clear channel between Green islands and Sharp point with depths of 11 and 12 fathoms.

Stony island, is dome shaped, 148 feet high, with two or three large conspicuous boulders on top of it, and in sunshine appears white; it is situated E. by N. 7½ miles from Torbay head and 2¼ miles from the shore; the island is composed of granite, steep-to, and may be approached to within a cable; between it and the shore there are depths of 23 to 12 fathoms.

North rock situated S.W. ½ W. half a mile from the highest point of the eastern Green island, has 8 fathoms over its shoalest part, with 20 fathoms at less than a cable around.

Passage reefs consist of three rocky patches, on which the sea breaks heavily with southerly gales.

The south-west reef with 18 feet water on it and 20 fathoms at the distance of a cable around, lies N.W. ¾ W. 4½ miles from the summit of the largest Eclipse isle; S.S.E. ⅓ E., 2⅓ miles from Stony island; and S.W. by W. ¼ W. 3 miles from Green islands.

The South-east reef with 5 fathoms on it and 20 fathoms at a cable around, lies E.S.E. from south-west reef, distant two-thirds of a mile; N.W. ¾ W. 3¾ miles from the largest of the Eclipse isles; N.W. ⅔ N. 2½ miles from North-west Eclipse rock; and S.W. ¾ W. 2½ miles from Green islands.

The Inner reef with 6 fathoms on it, bears N. by E. distant 8 cables from the south-west reef; N.W. 4¾ miles from the largest Eclipse isle; and W. by S. ¾ S., 2½ miles from Green islands.

Cave point, situated 2 miles S.E. by E. from Sharp point, is about 200 feet high, and faced with low dark cliffs, from which the shore trends suddenly to the northward for half a mile, thence east one mile to Black head, which projects a quarter of a mile, and has off its extremity a small black rock 50 feet high.

Northward of Cave point the grassy ridges gradually rise to 500 feet, and half a mile N.N.W. of Black head the tops of two dark bushy sand-hills may be seen.

The COAST from Black head trends E.S.E. 1⅓ miles to Peak head, with a deep bight between, having at its head a narrow rocky cove. At one-third of a mile E. by S. from Black head and 1½ cables off shore is a rock on which the sea generally breaks; nearly three-quarters of a mile eastward of the head and abreast the rocky cove is another sunken rock with 5½ fathoms over it, which breaks with a heavy southerly swell.

Landing.—On the eastern side of the bight, and half a mile N.W. of Peak head, is a small cove with a sand beach, on which, during easterly winds, landing may be effected, this being the only landing place between Torbay and King George sound.

Peak head, 491 feet high, is a bluff rocky projection, the south face presenting a slightly sloping bluff resembling when viewed from E. by N. and W. by S. the profile of a human face; about a quarter of a mile to the northward the land rises abruptly to a height of 735 feet, terminating in a conspicuous mass of granite boulders named Stony hill. Close to Peak head lies a small rock above water.

The COAST from Peak head trends in a N. by E. direction 1½ miles to a bluff, thence northward half a mile to a small sandy bight. A short distance round this bluff is a deep and precipitous ravine, out of which a stream of fresh water is constantly flowing, its northern side being formed by a narrow grass-topped ridge 500 feet high, sloping suddenly to the sandy bight. At the east end of this sandy bight is a dark round head of granite 60 feet high, being the western head of the peninsula extending to Bald head. Landing cannot be effected in this sandy bight as it is fronted by a ledge of rocks.

Bald head, 400 feet high, the eastern extremity of the peninsula forming the south side of the entrance to King George sound, rounds off with a smooth surface of rock almost destitute of vegetation, which gives it the appearance of being an elevated island of sterile-white aspect when approached from the eastward.

Limestone head, 767 feet high, is the highest point of this peninsula, and bears N.W. ½ N. about one mile from the extremity of Bald head.

At half a cable from the south side of Bald head is a ledge of rocks, 12 feet high, steep-to, and with 11 fathoms between them and the shore.

Eclipse islands, of Vancouver, are a cluster of rocky islands lying S. by W. 3 miles from Cave point, and S.W. by W. 7 miles from Bald head. The largest island, 357 feet high, is one mile long East and West, a third of a mile broad, and scantily covered with grass and shrub; a small spring of water, with a bitter taste, but not unwholesome, runs from the south-east slope of the island. Landing may be effected in a small indentation on the north-east side of this island, but not without some risk, as it requires exceptionally fine weather and smooth water.

At the south-east extremity of the largest island is a narrow, perpendicular rock, 85 feet high, almost detached from the island.

A rock nearly awash, on which the sea generally breaks, lies 2 cables from the north-east extreme of this island.

South-west islet, 137 feet high, barren and steep-to, with two other islets, 60 and 40 feet high respectively, north of it, lie off the south-west end of the largest island distant a third of a mile, with an apparently clear channel between; the northernmost islet has a detached ledge off its north end, and about a quarter of a mile West of it is a sunken rock on which the sea generally breaks.

Eclipse North-west rock, 5 feet above water, small, and steep-to, lies W.N.W. from the largest Eclipse island, and three-quarters of a mile distant. From the centre of the rock the highest part of the largest Eclipse island bears E. by S. 1½ miles, and Green islands N. ¾ E. 3½ miles; between this rock and South-west islet there are 24 fathoms.*

The channel between Passage reefs and Eclipse North-west rock, is 2½ miles wide, with depths of 30 to 33 fathoms; this channel should not be used at night.

Eclipse channel, between Passage reefs and the North-west rock off Eclipse island, is 2½ miles wide, and has a depth of over 30 fathoms. The extremes of Bald and Peak heads in line E. by N. ½ N. eads through this channel.

Cave shoal lies S. by E. one-third of a mile from Cave point, after a heavy gale, a swell was observed on it, but the least water found was 13 fathoms; less water may however exist.

Maude reef, the shoalest part of which is about 200 yards long in a north-east and south-west direction, and 150 yards wide; there is an overhanging pinnacle rock near its north-west extreme with 8 feet water on it, 5 to 7 fathoms close around, and depths of 25 to 34 and 37 fathoms, rocky ground at the distance of a quarter of a mile. On Maude reef the sea breaks only with a heavy south-westerly swell.

The west extreme of Breaksea island open of Bald head, bearing N. by E. ¾ E., leads eastward; and West cape Howe open south of the south-westernmost Eclipse isle, leads southward of Maude reef.

Vancouver rock, 15 feet high, 160 yards long, E.S.E. and W.N.W. and about 80 yards broad, is steep-to on all sides, and the swell which generally rolls in from the southward and westward on this part of the coast, breaks violently over it; from the highest point of Vancouver rock Peak head bears N.W. by W. ½ W. 2 miles and extreme of Bald head N.E. ¼ N. 2¼ miles. There are 20 to 28 fathoms between this rock and the shore.

Directions.†—The channel north of Eclipse islands is safe, but when working through stand no nearer Passage reef than to bring Stony hill in line with Black head; and with light winds do not approach the shore too closely, as there is always a heavy swell setting on it.

The North-west rock and the north side of the largest Eclipse island may be safely approached, care being taken to avoid the rock to the N.E.; vessels from the westward should, after passing North-west rock, steer to pass on either side of Vancouver rock, and close round Bald head into King George sound.

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* The breakers on North-west rock and Vancouver rock can be seen at a considerable distance, but the dangers themselves cannot be seen until a vessel is rather close to them. Remark Book, Lieutenant R.N. Ommaney, H.M.S. *Espiègle*, April 1882.

† In making King George sound in thick weather from the south-west, mount Gardner, which is situated about 8 miles East of the sound, makes as a peak, and has been mistaken for Peak head which lies 3 miles to the westward of the entrance to King George sound. Lieutenant T. Suckling, H.M.S. *Renard*, 1875.

The south side of Eclipse island may be approached to within half a mile, the extreme of Bald head in line with Vancouver rock, bearing N.E. ½ N. leads between Eclipse islands and Maude reef.

Caution by night.—Approaching King George sound at night this channel should not be used, neither should a vessel come nearer than 45 fathoms until Breaksea light (remembering that the light can be seen over the low neck of land behind Bald head bearing N.E.) bears N.N.E. ½ E., which will lead east of Maude reef and Vancouver rock.

KING GEORGE SOUND * is the most convenient port on this part of the coast for refitting, wooding, and watering, but only a small supply of provisions can be obtained; it is also the West Australian mail station for the Peninsular and Oriental Steam Navigation vessels.

The entrance of King George sound lies between Bald head, and Herald point at 5 miles N. by E. from it, and is divided into three channels by Breaksea and Michaelmas islands. The sound is about 5 miles wide, North and South, and 5 miles deep, with average depths of 10 to 5 fathoms, sand; on the south side of the sound there is a deep 2 miles long North and South, and one mile broad, having 11 to 20 fathoms, with 7 to 10 fathoms close around.

From Bald head the shore trends to the north-west 1½ miles to Limestone head, thence nearly 3 miles westward to a low narrow neck of land which projects about 1½ miles North to abreast Mistaken island, forming a bight named Frenchman bay.

From abreast Mistaken island the shore trends round nearly a mile in a north-west direction to Quarantine head, with a small cove between, formerly a whaling station. From this head a narrow strip of sandy hillocks extends about half a mile North to Possession point 151 feet high, scantily covered with bush and forming the south side of the entrance to Princess Royal harbour. Northward of Possession point there are several sunken rocks.

Breaksea island, N.E. by N. 3 miles from Bald head, is an elevated and rugged mass of rock 1½ miles long E. by S. ½ S. and W. by N. ½ N., and a quarter of a mile broad, with a small round islet 65 feet high close to its eastern end; at 20 yards from the south-east extreme of this islet lies a small rock 4 feet high. Near the south-west end of Breaksea island there is a small head 140 feet high, almost detached from the island. On the north-west side in a slight indentation a landing stage is erected, but owing to the constant swell washing round the island, it is necessary to drop an anchor a short distance off shore and haul in to the stage. The light keeper on the approach of a boat will attend to lowering the ladder.

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* *See* Admiralty plan:—King George sound and Princess Royal harbour, No. 2,619 scale m = 1·7 inches.

LIGHT.—An iron light tower, 43 feet high, rising from the centre of the keeper's dwelling, stands on the summit of Breaksea island, and 1,200 yards from its eastern extremity. The lighthouse is painted white, and exhibits a *fixed* white light at an elevation of 384 feet above the sea. The light is visible seaward in clear weather 24 miles, between the bearings of N.E. ¼ N. and W. by S. ½ S.; it is also visible over the low neck of land inside Bald head on a N.E. bearing. From within the sound it is visible all round, except when obscured by Michaelmas island.

Belches Foul Ground, on which during southerly gales there is a confused and dangerous sea, lies E.N.E. about 1¼ miles from Bald head, and consists of several patches, the shoalest being near the south-east and south-west extremes.

The easternmost patch, (breaking heavily in southerly gales,) with 5 fathoms on it and 20 fathoms at the distance of a cable, lies with Breaksea island lighthouse bearing N. ¾ E., 2 miles; and Bald head W. by S. ½ S., distant 1⅔ miles.

The westernmost patch, with 9 fathoms and 20 fathoms around, lies with Breaksea island lighthouse N.N.E. ⅓ E., 2⅙ miles; and Bald head S.W. by W. ½ W., distant 1⅒ miles.

King point light bearing N.W. by W. ¼ W. leads through the fairway into King George sound, between Breaksea islands and Belches foul ground. The summit of a remarkable, dark, wooded hill (on the mainland about 4½ miles N.W. by N. from mount Gardner) seen open to the eastward of the east extreme of Breaksea island bearing N.N.E. ⅓ E. leads eastward; the south-west extreme of Seal islet touching the north-west extreme of Limestone head N.W. by W. ⅓ W. leads westward, and Stony hill north of Peak head in sight southward of Bald head west, leads southward of Belches foul ground, and King point lighthouse bearing N.W. ½ W. leads between it and Breaksea island.*

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* When rounding Bald head a conspicuous notch on the east end of Michaelmas island kept in line with the round part of the west end of Breaksea island, N. by E. ½ E., is a good mark for running between Belches foul ground and Bald head. A vessel coming from the westward should be prepared for several heavy rolls on rounding Bald head, but the water smooths to leeward of Belches foul ground and Breaksea island.—Remark Book, Lieutenant Robert N. Ommaney, H.M.S. *Espiègle*, April 1882.

Michaelmas island, seperated from the north-west side of Breaksea island by a deep passage three-quarters of a mile wide, is covered with grass and stunted trees; it is a mile long East and West, and one third of a mile broad, the summit, 500 feet high, being near its west end.

From the north-west end of Michaelmas island a shoal extends north-west two-thirds of a mile with 3 fathoms nearly a quarter of a mile off and 4 to 5 fathoms beyond. A spit extends across from a short distance west of Herald point and nearly joins the spit extending from Michaelmas island; there are depths of 5½ and 6 fathoms between them.

Landing may be effected on the north-west side or in a small bight on the north-east side of Michaelmas island.

Michaelmas reefs consist of several patches extending westward of Michaelmas island, the shoalest of which, with 14 feet water, bears W. by S., distant one mile from the west extreme of Michaelmas island.

Two other patches with 4½ and 6 fathoms on them and 7 to 8 fathoms close around, bear respectively S.W., one cable, and S.W. by W. ½ W., 1½ cables from the shoalest part of Michaelmas reefs.

A buoy, chequered black and white, with staff and drum, is moored in 9½ fathoms water, S.W. by W., distant one-third of a mile from the 14 feet rock. Large vessels should not pass between Michaelmas island and this buoy.

Rock Dunder open south of Michaelmas island bearing E. ¾ N. leads to the southward, and the tangent of Bald head S. by E. or Gull rock North leads west of Michaelmas reefs.

Herald rocks, with 12 feet water, lie nearly half a mile South of Herald point; between Herald and Middle rocks the depths are from 6½ to 7 fathoms; and from Mount Pleasant rock to Michaelmas island 5½ to 6½ fathoms.

Middle rock, with 5¼ fathoms over it and 7 fathoms around, lies nearly half a mile from the northern extreme of Michaelmas island, and nearly midway between Mount Pleasant and Herald rocks.

Mount Pleasant rock, with 18 feet water, lies nearly midway between Michaelmas island and Herald rocks, with north extreme of Rock Dunder in line with cape Vancouver bearing East; and the eastern extreme of Herald point N. ¼ E.

Vessels drawing more than 10 feet should not use the North Channel without a pilot.

Seal islet, 105 feet high and 200 yards in diameter, situated nearly midway between Limestone head and Mistaken island, is steep-to except on its west side, from which a rocky spit extends three-quarters of a cable.

South Flat rock, 10 feet high and 100 yards in diameter, lies nearly 2 cables from the south shore of Frenchman bay, and 1¾ miles from Limestone head, with 3½ to 3¾ fathoms between it and the shore.

Mistaken island (Rabbit island), 143 feet high, one-third of a mile long East and West, 300 yards broad, covered with grass and stunted trees, is separated from the shore by a narrow channel half a cable wide in which there are several dry rocks. Off its east end lie several sunken rocks, and two dry rocks 6 to 8 feet high, named the Two Sisters; the easternmost of which lies one cable from the extreme of the island, with a small sunken rock half a cable north-east of it.

Frenchman bay.—A ship only wanting wood and water may anchor in a sandy bay in the south-west part of the bay, where two or three streams of excellent water run into the sea over the sand, from which a ship might complete in a day or two, by digging a well to collect it. Wood may also be procured at this place, but not of so large a size, nor perhaps of so good a quality, as at other parts. This bay is readily found by its being the first to the westward of a rocky point that projects from some remarkable bare sand-hillocks, as also from its being the second sandy beach to the westward of South Flat rock.

Anchorages.—The anchorage is good, being a bottom of sand and weeds, and is sufficiently protected from easterly winds by Breaksea and Michaelmas islands. A very convenient berth is in 8 or 9 fathoms water at one-third of a mile from the shore, with the centre of Michaelmas island over Seal islet, and South Flat rock S.E. by E. three-quarters of a mile. During the winter months a berth so near the shore should not be retained longer than may be necessary for completing a supply of water.

The anchorage between Seal islet and the first sandy beach to the westward of Limestone head, with South Flat rock bearing W. by S. ½ S., in 6 or 7 fathoms water, sand and weeds, should be preferred during the summer months, for the easterly winds then prevail, and sometimes blow strong, even as late as March. The anchorage is land-locked, excepting in the direction of E. by N., where the sea horizon is open to the extent of only 10°. There is no water nearer to this anchorage than in the sandy bay above mentioned.

The entrance of Princess Royal harbour being very narrow and contracted by shoals, a vessel only requiring water should give the preference to the anchorage south of Seal islet, where she would not be subject to any detention from easterly winds, that are fair for running along the coast to the westward, but which would confine a vessel in Princess Royal harbour. Captain C. R. D. Bethune, R.N., states that good anchorage may also be found West of Seal islet in 5½ fathoms water, at half a mile from the shore, where water might be completed more expeditiously than in any other place, as the casks might be filled in the boat. By a little digging, two vessels might water at one time.

Pilots.—For the harbour, it is desirable to take a pilot, who will be found on the alert.

PRINCESS ROYAL HARBOUR is the most convenient of the inner ports of King George sound. The entrance, which is about a quarter of a mile wide, lies between Possession and King points, and bears from Breaksea island lighthouse W. by N. ½ N. 6 miles, the depth in the fairway of the channel is about 25 feet at low water spring tides. The harbour which is 4½ miles long N.W. and S.E., and about 2 miles wide, is very shoal at its west and southern sides, the available portion for vessels drawing more than 8 or 9 feet being about 2 miles square.

Albany, founded in 1826, is situated on the north side of Princess Royal harbour between mount Clarence on the east and mount Melville on the west. The town jetty, which has a crane at the end of it, is 1¾ miles inside the lighthouse. The population in 1881 was upward of 1,000. Perth, the chief town of the colony, is 256 miles from Albany, between which there is a fair road and a line of telegraph. There is telegraphic communication with England through South Australia.

Communication.—The Peninsular and Oriental Company's steam-vessels carrying the mails call fortnightly. Steam-vessels also run between Freemantle and the intermediate ports.

Supplies of provisions may be obtained in Albany, but stores for refitting vessels cannot.

Water can be procured from a pipe on the town jetty by sending a boat at high water.

In 1881 there was only a small quantity of coal at Albany. The coal was of inferior quality, and the price 2*l.* 12*s.* 6*d.* per ton. In 1883, a company for maintaining a supply of coal was formed.*

Climate.—Albany is situated in one of the most healthy parts of Australia, and the thermometer is seldom below 60° or above 85°; this evenness of temperature at all seasons of the year is remarkable, and renders this spot particularly suitable for invalids.

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* Navigating Lieutenant H. Roxby, H.M.S. *Bacchante*, 1881; and Lieutenant H. L. Ross, commanding H.M.S. *Raven*, 1883.

Beacons, buoys.—The north side of the channel leading into Princess Royal harbour is marked by two beacons, the outer situated about half way through the channel at the edge of a 19-feet bank, and the inner in 19 feet near the extremity of the shoal sand-spit extending from Semaphore point. The south side of the channel is marked by two white buoys, the outer moored in 22 feet just north of the extremity of the sunken rocks extending from Possession point; the inner on the edge of the 19-feet bank just north of the west extreme of Possession point.

A black buoy is moored on the edge of a bank in 24 feet south-west of the harbour master's flagstaff and W. by N. ¼ N. from the Semaphore spit beacon.

A black buoy is also moored on the northern side of a 16-feet bank W. ¾ N. nearly a mile from the Semaphore spit beacon, with the Episcopal church bearing N.N.W.

A small red buoy is moored just outside Jail rock (dry at low water), which lies 1½ cables E. by S. ¾ S. from the end of the town jetty, and one cable from the shore.

A black buoy, for turning long vessels at, is moored in 4¾ fathoms water with the end of the coal jetty bearing N. ⅓ W.

LIGHT.—Princess Royal harbour lighthouse, consisting of a small wooden square tower 17 feet high, with the keeper's dwelling attached, is erected on the extremity of King point, the northern bluff of the narrow entrance to this harbour, and exhibits at an elevation of 47 feet above high water a *fixed* white light of the fifth order, visible in clear weather (through the approaches to the harbour) from a distance of 12 miles.

TIDES.—It is high water, full and change, in Princess Royal harbour at 11h. 3m.; springs rise 2½ feet, neaps 2 feet. The tides are greatly influenced by the wind, westerly winds causing high tides, and easterly winds low tides.

At King George sound there is a large diurnal inequality, which sometimes reduces the two daily tides to one. There is no tidal stream in the sound, but it runs with considerable strength in the entrances of Princess Royal and Oyster harbours.

DIRECTIONS.—Middle Channel, between Breaksea and Michaelmas is clear, and for steam vessels from the eastward is to be preferred, taking care, however, not to shut Rock Dunder in with Michaelmas island until past the chequered buoy off the Michaelmas reefs or the extreme of Bald head bears S. by E. At night when abreast the west end of Breaksea island steer more to the southward, and bring King point lighthouse north of W.N.W. before steering for it.

Northern passage, is not recommended for vessels drawing more than 11 feet water, without a pilot, there being neither leading marks nor buoys to define the channels between the rocks.

A vessel from the south-west or westward, having passed Bald head, should haul gradually to the westward, and steer a course directly for King point lighthouse if bound into Princess Royal harbour; but for the anchorages in Frenchman bay haul close round Limestone head.

Should there be a heavy sea running and it be desirable to pass south of Belches foul ground, Seal island (north extreme) should be kept, touching Limestone head N.W. by W. ¼ W. or King point lighthouse N.W. ½ W. until Breaksea lighthouse bears N.E. ½ N. If wishing to pass north of the foul ground King point lighthouse N.W. by W. ½ W. will lead between it and Breaksea island. It should be remembered that in squally weather with the wind from the southward and westward the gusts come down with great strength when in the vicinity of Bald and Limestone heads. Working in or out of King George sound, and not wishing to cross the foul ground, the channel between it and Breaksea should be used. The island is steep-to within half a cable, and standing towards the foul ground Seal islet should not be shut in with the fall of the high land inside Mistaken island W. by N. ¾ N., or King point lighthouse brought to bear to the northward of N.W. by W. ¼ W. until Breaksea island lighthouse bears N.E. ½ N.

King point lighthouse is sometimes difficult to make out, but the cluster of boulders on the rising ground above can always be seen, and may be used until near enough to see the building.

If bound for Princess Royal harbour a pilot should be obtained, but if proceeding without, on closing King point bring a remarkable bushy topped sand-hill on the ridge, south-west side of the harbour, in line with the south extreme of a small sand-patch about two-thirds down the hill bearing W. by S. ½ S.* This mark will lead between King point and the outer white buoy, which should be passed about half a cable distant; when abreast this buoy steer a little to the southward to pass midway between the inner white buoy and outer beacon, having passed which steer to the westward and anchor when convenient, observing that the residency open south of the town jetty leads outside the 3 fathoms edge off the north shore; and the church tower not brought to bear north of N.N.W. ½ W.

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* The sand-patch used as a leading mark into Princess Royal harbour is being planted, and will probably become useless as a mark. When the buoys and beacons can be seen, a mark is scarcely necessary; but it would not be prudent for a stranger to attempt to enter without being able to see them, as the tides run strong in the entrance. —Remark Book, Lieutenant Robert N. Ommanney, H.M.S. *Espiègle*, April 1882.

will keep a vessel east of the same depth, except on the 16 feet shoal marked by a black buoy.

When a steam vessel is signalled at night the pilots place a light on the Semaphore spit, and outer beacons, as they pass out to board the vessel.

OYSTER HARBOUR.—The shore from King point trends N.E. 2¼ miles to the entrance of Oyster harbour, which is half a cable wide with a bar at a quarter of a mile outside, having 10 feet water, but during spring tides the depth is increased to 14½ feet. Captain P. P. King, R.N., remarks that high water always occurs at night during springs, it would therefore not be prudent to attempt to cross the bar at that time.

Two rivers, the King and Kalgan, empty themselves into the harbour; the entrance to King river is nearly dry at low water, but the Kalgan is navigable for boats some 4 or 5 miles, where much useful timber is obtained. Oyster harbour abounds in fish, and a few oysters can be obtained by dredging on the banks.

Directions.—A vessel intending to go into Oyster harbour to refit or heave down (for which purpose it is more suitable than Princess Royal harbour) should anchor off the entrance and send a boat to sound the bar and mark the channel, as there are no well-defined leading marks. The channel inside the bar is clearly defined by the sand-banks on either side, and when past the narrows the vessel can be moored as convenient.

Water may be obtained by digging in the swampy ground near the beach, just round the eastern point of the entrance.

Telegraph.—The overland telegraph line from Albany to South Australia, crosses the mouth of Oyster harbour and extends through the country behind mount Manypeak to the eastward. Communication by this line was opened in 1877, thus placing the colony of West Australia in telegraphic communication with England.

The shore.—From the eastern entrance point to Oyster harbour trends S.E. nearly 1½ miles to Cheyne head, 513 feet high, and densely wooded. Half a mile from the entrance, and a cable off shore, lies Cheyne ledge, awash at high water, with 2 to 3 fathoms between it and the shore; at half a cable outside there are 4 fathoms water.

From Cheyne head the shore trends in an E. by N. direction about a mile, thence S. by W. half a mile to Ledge point, forming a deep sandy cove, sheltered from winds between N.W. round by north and east to South.

Ledge point, 170 feet high, has high boulders extending half a cable from its extremity. Between Ledge point and Herald point E. ½ S. 1½ miles from it the high sandy coast recedes about a quarter of a mile; the beach is fronted by sunken rocks about one cable from the shore.

Gull rock, about 32 feet high and 200 yards in diameter, lies W. ¼ S. one-third of a mile from Ledge point. Between it and the point is a clear channel with 3 to 5 fathoms water. Small vessels will find good anchorage in the cove, north-east of Gull rock in 3 fathoms sand, with Seal islet seen over the rock, and the west extreme of Breaksea island, just shut in by Ledge point. At the back of this cove are two lakes of fresh water; 1½ miles north-east of it is a high grassy ridge, 625 feet high, having on its summit a small but conspicuous bush, and on its western slope a remarkable granite boulder. There is another ridge 3 miles N. ½ E. from Ledge point, on the west slope of which is also a mass of granite boulders; between these ridges are extensive swamps, almost impassable during the winter.

Herald point, 226 feet high, is covered with grass, and about a quarter of a mile north of it a small stream of fresh water empties itself.

From Herald point Islet point bears N.E. about 1¾ miles, having between a high rocky head half a mile long; on either side of this head the shore recedes forming two sandy bights, both of which have a small stream of fresh water running into them; at the back is a grassy ridge 690 feet high, which gradually slopes towards Ledge point.

Remarks.—Captain R. Fitzroy, in alluding to an extraordinary degree of local attraction about this place, says:—"We could not ascertain the amount of variation with any degree of accuracy until our compasses were placed upon a sandy beach of considerable extent, near the sea. Whenever there was a stone (a kind of granite) near the instruments, they were so much affected as to vary many degrees from the truth, and quite irregularly; those on board were not influenced, at least not more than a degree." *

Islet point, 77 feet high, situated 1¾ miles north-east of Herald point, is composed of rock, and connected with the shore by a narrow sand-beach; on its western side is a small creek with an entrance about 20 yards wide through which boats may pass, and find safe landing on the beach inside. Landing may also be effected on its north side, but in easterly winds a heavy surf breaks on the whole of this coast.

The shore.—A quarter of a mile N.N.E. of Islet point is Taylor inlet, always closed, the beach is however so low that a heavy sea washes over. It is two-thirds of a mile long north-east and south-west, and a quarter of a mile wide. Oysters are found on the shoal sand-banks within. From Taylor inlet the sandy coast trends in an E. by N. direction for 2¾ miles to Rocky point. The whole beach is fronted by detached sunken rocks, extending about a quarter of a mile from the shore.

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* Voyages of *Adventure* and *Beagle*, Captain Robert Fitzroy, R.N., vol. ii. p. 625.

Behind the east end of this beach is a black bushy-topped peak rising from the southern edge of a bare sand drift over a mile square. Behind the sand drift are several lakes and swamps, from the vicinity of which rise several bushy ridges, varying from 200 to 360 feet in height. A conspicuous dark wooded hill, 540 feet high, lies N.N.E. 3 miles from Rocky point.

Off Rocky point are several rocks, the highest being 10 feet high, at one cable West from the point.

From Rocky point the shore trends E. ¾ S. 2⅔ miles, thence S.S.E. one mile to False islet; at one mile East of Rocky point, and a cable off shore lies Black rock, about a cable in diameter, and 40 feet high, having 2 and 3 fathoms between it and the shore, and 14 fathoms close to its southern side. The coast-line is fronted by a flat ledge of rock, outside of which there is deep water, but several sunken rocks lie about half a cable off it.

Inner islet, 100 feet high, rocky and covered scantily with grass, lies 1½ miles East of Black rock. A dry ledge extends from its southern end. East of this islet the land rises precipitously to a height of 687 feet.

False islet, 275 feet high, situated two-thirds of a mile from Inner islet, is a third of a mile long N.W. and S.E., and 300 yards broad, with a rocky ledge near its south-east extremity. False islet is connected with the mainland at low water by a short narrow ridge of rocks.

Mount Gardner, 1,300 feet high, is a peaked mass of granite, partially covered with grass and poisonous scrub, the deep gullies on either side having a dense growth of stunted gum trees. It bears from Bald head N.E. by E. ⅓ E. nearly 10½ miles. The east extreme of the Eclipse islands and the extreme of Bald head are in line from the mount, which is visible in clear weather about 50 miles.

On its seaward sides it has a steep descent to a cliffy rock-bound shore, terminating to the southward in a projection named cape Vancouver, 167 feet high, and perpendicular on its south and south-east sides.

Between False islet and cape Vancouver is a deep, rocky bight, the northern shore of which is almost perpendicular; its east side slopes gradually to a height of 448 feet. There is a depth of 20 fathoms rocky bottom close to the shore in this bight.

Rock Dunder, 196 feet high, is nearly a quarter of a mile long E.S.E. and W.N.W., and 100 yards broad. Close to its south-east extreme is a rock a few feet above water. It is steep-to on all sides, but should not be approached by sailing vessels nearer than half a mile, as the swell and current set directly on to it with considerable strength, especially during south-west winds.

The COAST from cape Vancouver trends to the northward nearly 3 miles to Two-People bay, about midway between which lies Caffin island, 148 feet high, half a mile long N.W. and S.E. and 300 yards broad, its north-west extreme being separated from the main by a channel a little more than a cable wide, having apparently about 3 fathoms over a white sandy bottom. Its north-west and north-east sides are steep-to, and off its south-east extremity are several dry and sunken rocks, the outer rock 8 feet above water and 250 feet in diameter lies S.S.E. 2 cables from the south-east extreme of the island, and N.E. by E. 1½ miles from the south-east extreme of cape Vancouver.

Two small rocks, on which the sea continually breaks, lie about 1½ cables S.E. by E. from Caffin island, and nearly quarter of a mile N.E. from the 8-feet rock. Between these rocks and the south-east extremity of the island is another dry rock and several sunken rocks.

Port Two-People, open to the eastward, is about 2 miles wide North and South, and 2 miles deep; about a cable N.W. from South point which projects a short distance from the south shore of the bay lies a dry ledge of rocks, with a sunken rock on which the sea generally breaks, a quarter of a mile to the eastward.

The western shore of port Two-People is a low sandy beach, behind which are two lakes; the southern is a mile in diameter, having a small stream, emptying itself over the sand beach at the south-west corner of the bay. On the south side of the bay is a low rocky ledge one cable from the shore, having shallow water and rocks between.

In the north-west corner of the bay is a small bushy-topped rocky headland projecting a third of a mile. From this head the shore trends E. by S. to North point, which is a rough stony headland with scant vegetation on its top, and connected with the main by a narrow ledge of rocks. Behind the point the coast rises steeply to a height of 640 feet, having on its summit a remarkable square granite boulder.

The COAST from North point trends W.N.W. half a mile, thence N.E. by E. 1¾ miles, the latter part being composed of a ridge of bushy-topped sand-hillocks 90 to 100 feet high, fronted by a long sandy beach, fringed with rocks. At the west end of this beach is a small stream, and another two-thirds of a mile from its eastern end. Both are salt for a considerable distance from their mouths. At the east end of the beach, the rocky shore projects nearly half a mile, and thence continues with several steep and rocky indentations 7½ miles in an easterly direction to Mermaid point.

Waychinicup river, situated 7 miles East of port Two-people, having a deep but narrow entrance, runs in a N.N.E. direction 3 cables;

East 2 cables; thence north-westward for some distance, abruptly terminating at the foot of a high cliff, over which the inland stream falls, forming in winter a picturesque fall. Excellent shelter may be found inside the second bend of the river.

Mount Manypeak, 1,855 feet high, is situated 3½ miles West of the Waychinicup river and falls gradually towards the river in a succession of granite-topped peaks, the eastern peak being 1,050 feet high. The ridge is a mass of broken granite rising abruptly from the sea, with deep gulches from which run several springs of fresh water.

Mermaid point.—The coast ridge in the vicinity of Mermaid point rises to a height of 500 to 642 feet, surmounted with huge granite boulders, and terminates about 2 miles north-east of the point.

The south-east and south-west sides of this point are high cliffs; its west side slopes gradually to two small sand beaches fronted by rocks; S.W. 4 cables from the south-west extreme of the point is a sunken rock on which the sea generally breaks.

Twin Islets, each 86 feet high, situated S.W. by S. 2 miles from Mermaid point, are 2 cables apart, with sunken rocks between. A shoal patch extends a quarter of a mile northward of the north islet.

Bald island, 1,020 feet high, is 2½ miles long, N.W. ½ N. and S.E. ½ S., 1¼ miles broad with its highest point bearing from mount Gardner E. by N. ½ N. 14½ miles; Bald island is visible in clear weather about 30 miles. Between the island and the mainland there is a deep passage three-quarters of a mile wide, the north point of which is named Channel point; a rocky shoal extends one cable from the north-west side of the island.

A ledge 2 feet above water over which the sea constantly breaks, lies S. by E. ½ E. nearly a quarter of a mile from the south point of Bald island with deep water between.

Half a mile from the north-east side of the island lies Bird rock, 12 feet high, near the south and west sides of which are two small dry rocks.

Landing may be effected during south-westerly winds in a small bight on the north side of Bald island.

Water may be obtained in the gullies at the north end of the island.

Haul-off rock.—A conspicuous granite rock 314 feet high, situated E. ½ N. 8 miles from Warriup point, and N.E. ½ N. 16 miles from the summit of Bald island, and about a mile off the mainland; off its south-west side is a low ledge of rocks, connected by a narrow rocky ridge, W.S.W. of which is a detached ledge, about half a mile from the highest point of the rock. There are 20 fathoms water at a mile to the southward of Haul-off rock, from whence the soundings gradually increase to 45 fathoms at about 20 miles to the south-eastward.

The COAST from Mermaid point trends N.E. ¾ E. 1¾ miles, to Channel point, with a steep rocky indentation half a mile deep between; the north-west shore of the bight rises perpendicularly to a height of 668 feet, terminating in a huge mass of granite; from this it slopes gradually to the northward and eastward forming a cliffy shore.

From Channel point the coast trends northerly about half a mile to Lookout point, with a small deep bight between, at the head of which is a sandy beach. Thence the coast extends N.W., and West 1½ miles to a small rocky point, and a sandy beach (Whaling cove) where a boat might land at any time except during heavy easterly gales. Two or three boat parties make this cove their head-quarters for whaling during the winter months. From Whaling cove a sandy beach (Cheyne beaches) extends to the N.E., and for 4 miles it is backed by grassy bridges 150 to 260 feet high. A long sand-drift then continues for about 3½ miles, backed at half a mile distant from the beach by bushy-topped hillocks 260 feet high.

At 10½ miles north-east from Whaling cove is Warriup point, steep and rocky. There are four small streams of fresh water along Cheyne beaches within a distance of 7 miles from Whaling cove.

At the back of Warriup point the coast rises to Warriup hill, a conspicuous scrubby mount 1,020 feet high, north-west of which a grassy ridge 800 to 1,000 feet high continues for 10 miles.

From Warriup point the coast trends about E. by N., 16 miles to cape Riche.

CAPE RICHE.—A cliffy projection, of level appearance and moderate elevation, bearing N.E. ½ N., distant 24½ miles from Bald isle. Two small rocks lie near the shore at 4 miles to the south-westward of it.

A covered reef, on which there is said to be not less than 3 fathoms, rises up in deep water, about S.S.E. ½ E. 3½ miles from the extremity of the cape. As the sea has seldom been seen to break on this danger, it is considered to be of small extent, but is very little known.

Cheyne islet, 112 feet high, lies N.N.W. rather more than a mile from cape Riche.

Anchorage and Supplies.—Whalers occasionally anchor in the bight north of cape Riche, from whence farm produce is frequently sent to King George sound by settlers at cape Riche.

Stirling range, situated about 30 miles N. ½ E. from mount Manypeak, is a high and rugged range of mountains about 30 miles long, in a general east and west direction, rising abruptly from a comparatively level country. The most remarkable peak is named Toolbrunup or Castle peak, 3,341 feet high, near the centre of the range, bearing N.N.W. ⅔ W. 38 miles from the summit of Bald islet, and N. ½ W. 37¼ miles from mount Gardner. The highest peak, 3,640 feet high, is named Bluff knoll, and lies 4 miles from the east end of the range. Ellen peak is a conspicuous, sugar-loaf peak near the east end of the range.

The Porongroup range, consisting of several rugged peaks, is remarkable, and lies 12 miles to the south-westward of the Stirling range, and about north from King George sound. Its highest point is 2,145 feet above the sea, and bears N.W. by W. 22¾ miles from mount Gardner, and N. ⅔ W., 24¼ miles from Limestone head.

The COAST, between capes Riche and Knob forms a bay 7 miles deep and 23 miles across. Groper point 190 feet high at 9 miles N.E. ¼ N. from cape Riche, projects upwards of 2 miles from the general line of coast, the land at the back rising to a height of 500 feet. Salt river discharges itself in the head of the bay at 2 miles northward of Groper point and 17 miles W. by N ½ N. of cape Knob. This bight may be known by the land on its west side being cliffy, and that to the eastward almost bare sand-hills.

Smooth Rocks, which are three in number and bare of vegetation, lie close to each other near the shore, W.N.W. 4½ miles from cape Knob; they are large and conspicuous objects against the mainland abreast of them, which is little else than bare sand. Roe rock 12 feet above the surface of the water, and about the size of a large boat, lies S.E. by E. ¼ E. 2 miles from the largest of the Smooth rocks, and about W.N.W. 3 miles from the south-west extremity of cape Knob.

CAPE KNOB, E. ¾ N. from cape Riche, is a rugged stony projection, extending East and West about 3 miles, with a sandy bight on each side; that to the eastward containing a small rocky islet. The middle stony lump on the summit of this cape is in lat. 34° 31′ 0″ S., long, 119° 14′ 30″ E. At 3 miles to the southward of it there are soundings in 40 fathoms.

HOOD POINT, 367 feet high, and N.E. by E. ½ E. 17 miles from cape Knob, projects in an E. by N. direction about 6 miles from the coast line, and makes like an island, it being connected with the main by low sandy land. Between its cliffy extremity and cape Knob is a projection 313 feet high, having a deep sandy bight on each side, the western named Dillon bay, and the eastern Bremer bay, into the head of which a stream flows.

There is a telegraph station at about a mile from the mouth of the stream in Bremer bay.

Doubtful Isles, which are four in number, the highest elevated 246 feet, lie off Hood point, and are rocky and steep; having a good channel nearly a mile wide between the outermost two, which lie 2 miles from the point, and another closer to it. Captain Flinders passed through this channel in H.M.S. *Investigator* into Doubtful island bay, carrying 20 to 24 fathoms water, which afterwards shoaled to 15 and 12 fathoms as he hauled close round their north side, between them and a sunken rock about a mile north-west of them.

He had 7½ fathoms, sandy bottom, at a cable from the shore, 2 miles within Hood point; but in the narrow channel between the inner island and the point, his boat found only 2 fathoms. The northernmost islet is composed of sand and rock, and is frequented by seals. At 2 miles to the eastward of these islands there are 35 and 38 fathoms water, and at 6 miles N.E. of them 33 fathoms; the soundings being irregular, and apparently deep close to the shore.

DOUBTFUL ISLAND BAY.—On the north side of Hood point the land trends West 2 miles, and then turns to the northward, forming Doubtful island bay, which is about 19 miles across, N. by E. ½ E. from Hood point to the foot of Middle mount Barren, and 5 miles deep, affording shelter in its south-west part from all winds that do not blow hard between N.N.E. and East; its north and western shores are composed of sandy and rocky land, with some barren-peaked hills rising to a considerable elevation at a small distance from the sea. At 3½ miles and one mile respectively to the south-west of Middle mount Barren, are Fitzgerald river and Dempster inlet.*

Mounts Barren.—West mount Barren, the south-westernmost of these hills, bears N.W. by N., distant 12 miles from the largest Doubtful isle; it is 1,220 feet in height, and is visible at the distance of 30 miles. Middle mount Barren, 1,500 feet high, is the summit of some steep rocky land, forming the northern extreme of Doubtful island bay, and is visible 35 miles off.

East Mount Barren, 982 feet high, E. by N. ¾ N. 17 miles from the Middle mount, is a third rocky hill of similar aspect, with high land stretching to the north-westward.

The COAST between Middle and East mount Barren is high and rocky, with 30 to 34 fathoms water at 4 or 5 miles from it; Red islet, 142 feet high, lies close to a projection 5 miles to the eastward of the Middle mount, between which and East mount Barren there are two inconsiderable bights open to the S.E., and just at midway is the entrance to Hammersley river; there is also a bight open to the southward, immediately under the mount.

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* *See* Admiralty chart, Doubtful island bay to the Great Australian bight, No. 1,059; scale, m = 0·12 of an inch.

The coast from East mount Barren becomes low and sandy for about 19 miles in an easterly direction, and then trends E. by N. ½ N. 21 miles to the bottom of a sandy bight, preserving the same aspect, with sand-hills here and there at the back; and is fronted by covered and dry rocks, that lie from 5 to nearly 10 miles off the land, with passages among them. From the sandy bight the coast extends E. by S. ½ S. about 15 miles to Shoal cape.

Mary Ann haven, situated 5 miles eastward of East mount Barren, and formed by reefs about 2 feet above water, is one mile in circumference, the only entrance, which is little over half a cable wide, being from the eastward. In the middle of this haven lies a rock above water, at one cable North of which the deepest water and best anchorage will be obtained.

The *Lily* remained at this anchorage two days, during a S.W. gale, and although the sea broke heavily on the outside reefs, it was quite smooth inside.*

Dangers East of Mounts Barren.—The westernmost of the dangers known to exist off this part of the coast is a small covered rock, 7 or 8 miles off shore, bearing from East mount Barren nearly S. by E. ½ E. distant 8 miles, with 25 fathoms water in-shore of it, but no bottom with 44 fathoms to the southward; the sea breaks on this danger only at times. At East 3 miles is a similar rock, and about E. ½ N. 9 or 10 miles from the danger just described, there is another of greater extent, on which the sea breaks high; caution and a good look-out are therefore requisite in navigating this part of the coast, as the soundings give no intimation of the vicinity of these dangers, many of which are several feet below the surface of the sea, and are only occasionally to be discerned in rough weather.

West island, a small low rocky island of smooth and sterile aspect, and frequented by seals in 1802, lies S.E. by E. ½ E. 25 miles from East mount Barren. Breakers extend northward and north-westward from it, nearly half-way to the mainland, which is 8 miles distant, and appears to be fronted by other breakers approaching so near the former as to render the existence of a safe channel between them very doubtful; it is otherwise very steep, with soundings in 38 fathoms between the island and Black rock a small reef lying W. by S. 2 miles from it, and 35 fathoms at 3 miles to the eastward; but there is no bottom at that depth at a mile off its south side.

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* Mr. C. McLachlan, master of the schooner *Lily*, 1879.

Rocky Islets.—A cluster of four small rocky islets lie East 21 miles from the last-mentioned isle, with 34 fathoms water half-way towards the low and sandy mainland, which is distant 10 or 11 miles from them; the northernmost islet is the largest, and the whole are surrounded with breakers that appear to extend farthest off their south-west end. A small detached breaker is laid down in the charts of Flinders and D'Entrecasteaux, at N.E. by E. ½ E. between 2 and 3 miles from the body of the group.

The soundings decrease eastward from 35 to 23 fathoms, at 5 miles North of this detached danger, which renders it probable there may be other covered rocks in its vicinity; and it may be necessary to remark, that the total absence of information relative to the south side of this cluster renders great caution necessary in approaching them in that direction.

SHOAL CAPE, nearly East 55 miles from East mount Barren, is composed of sand-hills, forming like white cliffs, and has an islet, surrounded with much broken water, close to its south-east side. The appearance of an opening in the land, on each side of this cape, was observed by Captain Flinders, while passing in 33 fathoms water, at 5 or 6 miles off, but was thought to be a low connexion between the sand-hills. Young and Lort rivers, both of which are crossed by the telegraph line, discharge their waters into a lagoon 2 miles to the northward and westward of Shoal cape.

Fanny Cove immediately to the eastward of Shoal cape; the entrance to this cove is between two sunken rocks about half a cable apart. There is very little room in this cove, and during the time the *Lily* was there she was moored to keep her off the rocks. Fresh water can be obtained at a sheep station within 3 miles of Fanny cove.

The COAST from Shoal cape trends about E. ½ S. 32 miles to the west point of Esperance bay; at 25 miles from the cape is a point of land, apparently surrounded with breakers, and having a small dry rock on its east side; to the westward of this the coast forms two or three open sandy bays, destitute of shelter; and to the eastward an open bight; off the eastern part of which are some dry and sunken rocks.

Red islet, E. ½ S. 8½ miles from Shoal cape, lies off Barker inlet and about 2½ miles from the mainland. At 6 or 7 miles to the southward of Red islet the soundings are irregular from 25 to 42 fathoms, and become deeper as the islands to the eastward are approached.

ARCHIPELAGO OF THE RECHERCHE AND ADJACENT COAST.

The Archipelago of the Recherche commences abreast this part of the coast, and extends about 123 miles from the western island of the West group, in lat. 34° 2′ S., long. 121° 35′ E., to the northern rock of the Eastern group, in lat. 33° 43′ S. long. 124° 5′ E.; but to give a minute description of every island and reef in this dangerous labyrinth would be both impracticable and useless; a notice of its most remarkable and detached objects must therefore suffice, with a description of the coast, and Flinders' chart, to conduct any navigator who, from choice or necessity, may happen to encounter them. They should be avoided by a vessel beating to the westward, on account of the haze that is frequently found to prevail among them, and in the neighbourhood of the small detached reefs in the south-west part, which lie 15 or 18 miles from any neighbouring islands.*

TERMINATION ISLAND, in lat. 34° 30′ S., long. 121° 58′ E., is the south-westernmost island of the Recherche archipelago, and is little else but a smooth mass of rock, rising gradually to rather a peaked summit, visible 27 or 30 miles in clear weather; a small rock, surrounded with breakers, lies half a mile off its north end. Soundings in 62 fathoms, white sand, were obtained 6 or 7 miles to the S.W.; and in 72 fathoms, coral, about W. by S. ½ S. 50 miles from this island; but farther south they are quickly lost.

Brown Reef, lying about 3 miles N.E. by E. from Termination island, was discovered by Mr. A. E. B. Brown, Master of the barque *Albyn's Isle,* 1875. The reef dries about 4 feet and is 50 yards long East and West; several other reefs, the positions of which are doubtful, lying to the northward of Termination island, were also seen from the *Albyn's Isle.*

The Twin Rocks, two small lumps of reddish appearance, lying N.E. by E. ¾ E. 13 miles from Termination island, are conspicuous objects on a reef which extends about a mile all round them, with deep water close to its edge.

There is a small reef, with two rocks above water, laid down in the French charts, bearing nearly N.W. ¾ W., distant 16 miles from Termination island; and a dry rock surrounded with breakers lies N.N.W. ¼ W. 12 miles from the island. At half-way between the former and the western island of West group there is another reef, with two dry rocks on it, seen by Captain Flinders, and by the French.

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* From the result of the observations, it appears, the islands of this Archipelago possess a considerable degree of magnetic attraction.—*Flinders,* vol. i. p. 85.

The Causeway is a chain of reefs projecting westward to about 4 or 5 miles north-eastward of the last mentioned reef, from a great number of islands that front cape Le Grand, which lies East 24 miles from the south-west isle of the West group.

The islands and reefs just described are the south-westernmost dangers of the Archipelago that are known to exist; and within their limits the chart of Flinders must be consulted for many dry and covered reefs with which the sea is studded towards the mainland.

WEST GROUP consists of three principal islands, lying from 7 to 10 miles from the mainland, and occupying a space of 5 or 6 miles in an E.N.E. and W.S.W. direction, with several small islets and breakers scattered among them. The south-westernmost is the largest of the cluster, with a small hill on its north and south ends; the whole being rocky and moderately elevated, with 46 to 48 fathoms water at less than 2 miles from their south side, and a safe passage to the northward.

Sunk Rock.—A small sunken rock lies East 4 miles from the middle island of West group, with soundings in 40 to 30 fathoms between it and the great number of high rocky islets already noticed as fronting cape Le Grand, to the eastward.

Observatory Isle, 6 or 7 miles to the north-eastward of the nearest of the West group, is about 1¼ miles long, N.W. and S.E., and lies close to the southward of a point on the mainland that forms the west side of L'Esperance bay.

Anchorage.—There is a passage all round Observatory isle; and between its north-east side and some covered and dry rocks at a mile to the eastward, the French ships, *La Recherche* and *L'Espérance*, in December 1792, under Admiral D'Entrecasteaux, anchored in 23 fathoms water, fine sand, at half a mile from the shore, having the mainland to the North, and the numerous islands fronting cape Le Grand, at about 9 miles to the south-eastward. But this confined anchorage can by no means be recommended, even for a night, unless in very fine weather, on account of the strong winds that frequently blow in the neighbourhood, and which obliged the French ships to ride with three anchors ahead, in order to prevent being driven on shore.*

Fresh water could not be procured in the neighbourhood of this anchorage in the month of December, but extensive salt lagoons were found to occupy that part of the main immediately behind it; and the whole country as well as the islands, proved rocky and sterile.

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* Voyage de D'Entrecasteaux, vol. i. p. 181.

L'ESPERANCE BAY extends from the west point abreast of Observatory isle, S.E. by E. ¾ E. nearly 17 miles to cape Le Grand, and is 9 miles deep, but is filled with so many rocky islands and reefs both above and below the water's surface, that its utility as a place of anchorage is very doubtful. In its north and south-eastern parts good shelter from south-west and southerly winds may probably be afforded by the numerous islands and reefs in those directions; but the shores of the bay have not been minutely explored, and should be approached with caution.*

Telegraph Station.—Close to the shore, at 6 miles eastward of the west point of the bay, and near Dempster station, there is a telegraph station.

CAPE LE GRAND, in lat. 34° 1′ S. long. 122° 4′ E., which forms the south-eastern point of L'Esperance bay, projects 2 or 3 miles into the sea in a W.S.W. direction, towards the chain of high rocky islets already noticed, that extends southward from the bight of L'Esperance bay, having among them many narrow channels with deep water, and forming part of the Recherche archipelago. Near the shore, in the south-east corner of the bay, and N.E. by E. 5 miles from the extremity of the cape, is Frenchman peak, visible 40 miles, with a smaller hill between them; inland from this peak the country is represented to be sandy and barren. No dangers are known to exist immediately off this cape, except a small rocky islet about a mile to the S.S.E., and a smaller islet at a mile to the eastward of the former.

Remark Islet, S.W. by W. ¼ W. 7 miles from cape Le Grand, is situated near the centre of the group of islands off the cape, and although small, is rendered more remarkable than the others by a high round summit, to which the islet owes its name. Small islands, interspersed with numerous reefs, extend 8 miles southward and south-eastward from Remark islet; and the chart shows two more remote patches than the others, one bearing S. by W. ½ W., distant 11 miles, and the other S. by E. ½ E. 12 miles from the islet, the latter patch having two rocks above water.

The COAST from cape Le Grand trends eastward 6 miles to a point separating a small bay, fronted by four dry rocks, from Thistle cove, on the west side of the point. At midway between the cape and the point, and one mile from the shore, lies a small island with a dry rock and some

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† During the exploration of a part of this coast made by Mr. Forrest in a land journey from Perth to Adelaide, by way of the Great Australian bight in 1870, the party was without difficulty replenished with provisions and stores, in L'Esperance bay, from a small schooner sent from Perth. At that time Messrs. Dempster, enterprising settlers, resided in L'Esperance bay.

breakers at S.S.E. one mile from it, and several dry rocks lie near the shore between the island and the cape.

Thistle Cove, which may be known by its lying S.E. 3 miles from the high peak over cape Le Grand, is little more than half a mile in extent either way, but it has 10 fathoms water in its entrance, 7 fathoms in the north-east part, and it affords complete shelter in its western corner, where a single vessel may be placed in perfect security, with anchors out on the off bow and quarter, and hawsers on the other side fast to the shore. She would thus lie in from 3 to 5 fathoms water, almost near enough to lay a stage to the beach. This is much superior to Lucky bay, to the eastward, where neither wood nor water can be procured without much time and trouble, nor is the shelter so complete; but Thistle cove is too small to be entered in a gale of wind.

In approaching Thistle cove a look-out must be kept for a small sunken rock, on which the sea breaks only at times, bearing nearly S. ½ E., distant one mile from the west point of the cove.

Wood and Water.—There is wood for fuel, though in no great abundance; and at less than 100 yards from the shore is a lake of fresh water a mile in circumference, from which a small stream runs into the cove; but another stream descending from the hills nearer into the western corner, would better suit the purposes of a ship.

LUCKY BAY, which is separated from Thistle cove by a small projection nearly a mile across, may be known by its lying North nearly 7 miles from the high Mondrain isle, and 2½ miles westward of the east point of the land of cape Le Grand. At South a little more than a mile from the east point of the bay, are two small islands, between which is a clear channel one mile wide, with 20 fathoms water, and 35 fathoms between the islands and the point. The bay is about a mile in extent, and afforded anchorage to the *Investigator* in its north-east part, in January 1802, but it is open to the S.W., in which direction the numerous isles and reefs in the offing are 8 miles and more distant. The north-west part of the bay is shoal, but in the entrance the depth is 17 fathoms, which decreases gradually towards the sandy beach at its head, where wood and water are procurable, though not with so great facility as in Thistle cove. Between Lucky bay and the east point of the land of cape Le Grand are numerous islets and rocks, which extend 5 or 6 miles south-eastward from the coast.

MONDRAIN ISLAND, one of the largest in the archipelago and visible 30 miles, is upwards of 3 miles long, North and South, and 1½ miles wide; with breakers surrounding two rocky islets near its west side, and other breakers extending about a mile, perhaps farther, off its south point. There is also a detached reef nearly 2 miles from the north point of the island, with 25 to 30 fathoms water on three sides of it; and 19 fathoms between it and the point. The chart shows an islet with reefs projecting from its north-east and west sides, lying W. by N. 2 miles, and another islet, W. ½ S. 4 miles from the south point of Mondrain island, with a sunken rock at 2 miles to the north-westward of the latter. This island was considered by Captain Flinders not to afford secure anchorage; and a vessel seeking it there, should look out for a reef running a little way from a small islet off the north-east side.

At 3 or 4 miles off the east side of Mondrain island lie two clusters of covered and dry rocks, with 25 and 26 fathoms water between them, by borrowing towards the northern cluster, in a channel 1½ miles wide; but other covered reefs exist to the S.E. of this channel, towards Draper isle, and the chart shows two islets lying close together S.E. ¼ E. 7 miles from the summit of Mondrain island.*

Draper Isle, E. by S. ¾ S. 13 miles from the summit of Mondrain island, is an elevated mass of rock, with a dry rock and breakers about a mile off its north-east end.

At N.E. by E. ¾ E. 9 miles from Draper isle, a small sunken rock is laid down in the French chart; which position is nearly equidistant at 6 or 7 miles from three small islands to the N.W. by W. ¾ W., N.E., by N., and E. by N. ½ N., having apparently clear channels and deep water among them; but another sunken rock is shown on the chart to lie S.W. by W. ¾ W. 3 miles from the westernmost, and a reef at 2 miles to the southward of the easternmost of the three small islets. This small sunken rock not having been seen by Captain Flinders, who passed in the *Investigator* at 6 or 7 miles to the northward, it is probable the sea does not at all times break over it.

Sunken Dangers.—A small sunken patch lies E. by S. ½ S. 19 miles from Draper isle, and is the more dangerous from the sea only breaking on it at times, and when the water is smooth, perhaps, not at all. But to the southward of Draper isle, between the Twin rocks and the patch, the sea is apparently clear.

Another patch of a similar kind, but smaller, was seen by Captain Flinders, N.E. by N. 6 or 7 miles from the former, and must have been passed very close by Admiral D'Entrecasteaux, in 1792, without being seen.

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* Communication between L'Esperance bay and Mondrain island, was effected in a boat by Messrs. Dempster, settlers in the former place, 1870.

Caution.—Although there appears to be a clear sea also between the latter patch and the north extreme of South-east isles, E. ¼ S. 28 miles from it, the existence of these insidious dangers, and probably of more in their vicinity, renders it advisable for a vessel making a passage not to go to the northward of a line from Termination isle, E. ¼ N. 74 miles, to south extreme of South-east isles.

The COAST.—To the eastward of the east point of the land of cape Le Grand, the low sandy shore forms a bay 4 or 5 miles deep, extending from the point E. ¾ N. 12 miles to Cheyne point. In the western part of this bay is a bight with numerous islets and rocks off it, and between two clusters of these islets there are soundings in 10 fathoms, at 2 miles from the mainland, towards which the depth gradually decreases to 4 fathoms at half a mile from the beach. According to Flinders' chart, this bight appears calculated to give complete shelter from all westerly and northerly winds, and is defended to the eastward and southward by small islands and reefs, both contiguous and in the offing; but the passage to this anchorage lies among numerous dry and covered rocks, which are very little known. There are also several small islets and rocks in the eastern part of the bay, the largest and most distant from the shore being Station islet, which lies 4 miles to the westward of its east point.

At 3 miles E. ¼ S. from Cheyne point is another point, from which mount Belches rises to a height of 550 feet. From this point cape Arid bears East 29 miles, forming a second bay 8 miles deep in the eastern part.

The coast between mount Belches and cape Arid is sandy and generally low, with higher land on its projecting parts.

The intermediate space, from 10 miles E.N.E. of Mondrain isle to 13 miles westward of the summit of cape Arid, being chiefly occupied by a chain of small rocky islands and dry and covered rocks, extending as far as about 7 miles from the shore.

Duke of Orleans bay, situated about 26 miles eastward of cape Le Grande, affords good shelter; there are, however, two sunken rocks in the middle of the bay, which can be seen from aloft by the kelp. The nearest habitation to this bay is 30 miles inland.

Tagon harbour.—The coast from Duke of Orleans bay trends about East 17 miles to Tagon harbour, with several islands and sunken reefs between; tolerably close inshore appears to be the clearest passage, and anchorage can be obtained should the wind fail. Tagon harbour is formed by a high bluff extending in a southerly direction about one mile.

The anchorage is on the east side of this bluff in 6 fathoms, white sand, with the extreme of the bluff bearing S.S.E.

The nearest sheep station to Tagon harbour is 13 miles inland.

Water can be obtained by digging at the back of the sand hills.*

CAPE ARID in lat. 34° S., long. 123° 10′ E., is 1,160 feet high, sterile, and rises to rather a peaked summit, that projects 6 or 7 miles from the mainland, to which it is joined by a low sandy isthmus, forming a large sandy bight on each side; that to the westward, which is 10 miles wide, N.W. ¾ W. and S.E. ¾ E., and 5 miles deep, and forming the eastern portion of the second bay previously alluded to, has not been distinctly traced, but contains two small islands near its shore. Tagon harbour is in the north-west part of this bight.

The cape is bordered by many small rocks and breakers, which project nearly a mile from the shore, and off its western extremity there is a detached reef bearing from it S.W. ⅜ S., distant 1½ miles.

Twin Peaks, the most conspicuous of these islands, lie nearly West 16 miles from cape Arid; they are 2 miles apart bearing from each other nearly N.E. ¾ E. and S.W. ¾ W., on separate islands, and are visible 27 miles. On steering to pass to the northward and eastward of the Twin peaks, and the small islands immediately contiguous, the *Investigator* shoaled the water from 30 to 10 fathoms, and then suddenly to 3 fathoms, when the bottom was distinctly seen under the ship; at this time she was nearly in line with the Twin peaks, at 2 miles from the north-eastern one, and immediately deepened to 7 fathoms, steering towards the two easternmost islands of this chain, between which were found 20 fathoms, in a channel about three-quarters of a mile wide.

MIDDLE ISLAND, nearly south from cape Arid, is the largest of the Recherche archipelago; the round hill on its north-west point, which is visible about 22 miles, bearing S. by W. ½ W., distant 7 miles from the summit of cape Arid, and the intermediate space of 5 or 6 miles being strewed with small islands and reefs. Between these and the north-east point of Middle island there is a passage with 16 to 9 fathoms water, and from 14 to 20 fathoms are found within a mile of the island on its east and south sides; the western part having no bottom in 14 fathoms, at a quarter of a mile from its steep rocky shore.

Goose Island Bay.—Goose isle, which lies about one mile off the north side of Middle island, is small and very rocky, but bold to approach having deep water close to its shore, except on the south-east side. Goose isle bay is an indentation of the northern side of Middle island, extending from the north-west extreme E. by N. ½ N. 2½ miles to the north point of the island. The bay consists of three sandy beaches separated from each other by rocky points; between which and Goose isle anchorage may be found on a sandy bottom.

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* Mr. C. McLachlan, master of the schooner *Lily*, 1879.

Anchorage.—Between Goose isle and the middle sandy beach, where the anchorage is contracted, there is a bar with 3 fathoms water on its deepest part; to the westward of which the depth to anchor in is 7 fathoms, in line between the western sandy beach and the west end of Goose isle, with the north-west point of Middle island W.N.W.; the bottom of sand and weeds will then be plainly visible under the ship.

On the east side of the bar the anchorage is in 11 and 12 fathoms water between the north points of the two islands, at about three-quarters of a mile from each; but the anchor does not hold so well here as in the former situation, occasioned perhaps by the increased depth of water; there is also a small rock above water, lying a third of a mile from the east side of Goose isle, having 7 fathoms close to it.

Supplies.—Among the tufts of wiry grass on the summit of Goose isle, and on most of the neighbouring isles, a large bird, called the barnacle goose, is to be found during the summer months, and may be easily taken. Firewood of small size may be procured on Middle island, in sufficient quantity for the supply of two or three ships; but no fresh water is to be had, except perhaps during the winter, Captain Flinders having found even the drainings from the hills too salt to be drinkable in the month of January. Cape Arid appears more likely to afford fresh water, which should be sought in the bight on either side, at the foot of the high land that forms it. During the summer, a great quantity of salt may be obtained from a small lake behind the eastern sandy beach in Goose isle bay.

The Tides are very weak and inconsiderable in this neighbourhood, and are much influenced by the wind.

Dangers N.W. of Middle Island.—To the north-west of Middle island there are several small detached reefs and sunken rocks, the nearest of which lies N.W. ½ N. 1½ miles from the round hill on the north-west point, and does not always show itself. There is a clear passage nearly a mile wide between this and a small dry rock W. ½ S. from it, which has 28 fathoms water within half a mile of its north side. Two covered patches lie respectively 1½ and 2½ miles to the westward of the small dry rock.

Low Flat Isles are four in number, extending between 4 and 11 miles westward from Middle island, and surrounded with breakers; there is also a small rocky island E.S.E. 6 miles from Middle island, with breakers off its west side, and a detached reef at one mile from its north-east point.

Douglas Isle lies S.W. by S. nearly 3 miles from the south-west point of Middle island, with a clear passage between them, and no bottom with 35 fathoms at a mile from the north side of the former island, which is low and rocky, and rises quickly to the summit of steep rocky cliffs, that face to the southward and westward. A deep notch in the middle, over which the sea must break in rough weather, gives it the appearance of two isles near each other; the eastern half being very rocky and uneven, and entirely without vegetation.

THE SOUTH-EAST ISLES of Recherche archipelago lie respectively S.E. ¼ E. 21 miles, and S.S.E. ¾ E. 25 miles from the summit of cape Arid; the southern or larger isle, which appears at a distance as two islands lying close together, is about 3 miles in extent N.E. by N. and S.W. by S., and, like Douglas isle, is nearly divided in two by a narrow strip of low land. Breakers lie W. by N. 1½ miles from its north point.

The northern of the South-east isles, which is about one mile in extent, lies N. by E. ¾ E. nearly 6 miles from the former; it has not been approached very closely, but was observed by Captain Flinders to have a reef lying 4 or 5 miles from it in a N.E. by E. direction.

In consequence of D'Entrecasteaux's chart placing the southern of these islands 6′ more South, and 7′ more East than the position assigned to it by Flinders, he considered it probable a third island might exist hereabout; but Lieutenant P. P. King, H.M.S. *Mermaid*, made these islands from the S. by E. in January 1818, and saw only the two laid down in his chart.

POLLOCK REEF.—This dangerous reef was discovered in 1834, by Captain Pollock, in the merchant barque *Merope*, who describes it as extending 8 or 10 miles East and West, and being about 100 yards broad, with apparently about 2 feet water upon it. The western extremity, upon which alone the sea was breaking when the reef was seen at 7 A.M., is in lat. 34° 35′ S., long., 123° 27′ E., or S. ¼ W. 14 miles from the largest of South-east isles.* Capt. C. R. D. Bethune, H.M.S. *Conway*, in 1838, places it in lat. 34° 34′ S., long. 123° 25′ E., and observes: "I steered to make the Pollock reef, and at daylight was 2 miles from it; it breaks heavily over a space of about a quarter of a mile; at North 2 miles from it there are 40 fathoms water, sand."† §

CAPE PASLEY forms a hill that is visible 28 or 30 miles, and bears E. by N., distant 13 miles from cape Arid. The cairn on its summit is 345 feet above the sea; there is a spring at its base near to the shore. A low islet lies 3 miles southward of the cape, with some rocks and breakers extending N.E. nearly 2 miles from the islet, between which and the mainland are soundings in 28 to 34 fathoms, shoaling to the N.E.; but in approaching the cape from Middle island a look-out must be kept for a small dry rock surrounded with breakers, S.W. by S. nearly 10 miles from the summit of this cape, and about the same distance from that of cape Arid; the rock is steep-to having no bottom with 34 fathoms at a mile from its north side.

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* "Nautical Magazine," 1835, p. 201.

† Ibid. 1842, p. 232.

§ Lieutenant J. S. Roe, R.N., in 1856, when passing at a distance of 8½ miles to the southward of Pollock reef, under favourable circumstances, ascertained the position of that part of the reef on which the sea breaks, to be 14 miles S. ½ E. from the nearest part of South-east isles, the breakers extending one-third of a mile in an east and west direction, and one-third of a cable in width.—*Nautical Magazine*, 1856, p. 628.

Between these two very projecting capes there is an extensive sandy bight open to the S.E., which has not been explored, but appears capable of affording shelter from all westerly and northerly winds.

Malcolm point, N.E. ¾ E. 14 miles from cape Pasley, is low and sandy, with a dry rock close to its extremity, and a ledge of rocks extending from it upwards of 2 miles to the north-eastward.

The COAST between the cape and Malcolm point for the first 5 miles forms a slight indentation, fronted by some small islets. In proceeding north-eastward from cape Pasley the depth decreases from 20 to 10 fathoms when passing outside a sunken rock, which lies S.S.E. 2¼ miles from Malcolm point, and upon which the sea only breaks at times. From Malcolm point a low sandy shore curves round into a sandy bight and extending from the point north-east 11 miles, to Dempster point.

Israelite bay, which lies just North of Dempster point, affords good anchorage in 3 fathoms water, inside a reef that extends in an E.S.E. direction from the shore. The *Lily* anchored with the extreme of this reef bearing S.E. and rode safely during a S.S.E. gale.

There are several shoals in Israelite bay; they can, however, be seen from aloft.[*]

Telegraph Station.—There is a station in Israelite bay.

Round Isle is a conspicuous small lump of rock, bearing N.E. by E. ¾ E., distant 17 miles from the northern of the South-east isles, and S.E. by E. ¼ E. 20 miles from the summit of cape Pasley. Two small rocks lie upwards of half a mile off its north and north-west sides; but they are very conspicuous, and are the only dangers known to exist in its vicinity.

THE EASTERN GROUP of the Recherche archipelago consists of eight low sterile rocky islets and a rock above water lying from 11 to 18 miles off the north-east point of the sandy bight to the northward of Malcolm point, and scattered over an extent of 10 or 12 miles. The southernmost and largest island is 2 miles long, with some vegetation on its surface; and it resembles the southern island of the West group, in having a hill, that is visible 24 miles, on its north and south ends.

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[*] Israelite bay is in latitude 33° 37′ S.: in 1870, the schooner *Adur* attached to the Forrest expedition remained safely at anchor here for several days.

During the visit of the *Lily* to this part of the coast, between the months of November 1878 and January 1879, the prevailing winds were from the eastward, with hazy weather.

A chain of sunken rocks appears to connect this island with the greater part of the group that extends North 7 miles from it, leaving apparently clear channels between them and the remaining two islands in-shore; one of these lies from Malcolm point E. by S. ½ S. 11 miles, and the other E. ½ N. 13 or 14 miles, with soundings in 20 to 23 fathoms between them and the mainland.

Aspect.—A level bank of land commences behind cape Arid, where it bears the appearance of having once formed the seashore; it continues from thence with a remarkably uniform aspect, nearly E. by N. ¾ N. 435 miles, to the head of the Great Australian bight, preserving an elevation of 400 to 600 feet above the level of the sea, and intercepting the mast-head view of the interior country, with the exception of the first 60 miles.

Mount Ragged.—In that space some craggy, barren-looking hills, 15 to 30 miles in the interior, and of considerable elevation, are visible over the bank; mount Ragged, 1,920 feet high, the most remarkable of them, bearing from Malcolm point N.W. by N., distant 25 miles.

The COAST, from the point north-east 7 miles from Dempster point, trends about N.E. ½ N., and is low and sandy, without irregularity for 48 miles, forming a bay 10 miles deep.

Islets near the Coast.—There are two small islets, with a reef extending more than a mile off their east side, lying nearly East 7 miles from Dempster point, and about 4 miles from the shore. There are soundings in 18 fathoms about a mile to the S.E. of the breakers, but the water quickly shoals to 6 fathoms at 3 miles to the N.E. of them, and the depths are afterwards variable between 12 and 8 fathoms at 4 or 5 miles from the shore to the northward.

CULVER POINT, 285 feet in height, is the bluff eastern extremity of a range of cliffs of moderate elevation, which commence about 5 miles to the north-westward of Malcolm point, where the bank of level land behind that point approaches the water side.

Dover Point.—From Culver point these cliffs extend E. ½ N. 10 miles, and then N.E. by E. ½ E., upwards of 70 miles, without any remarkable feature by which one part can be distinguished from another, except at 57 miles from Culver point, where a slight projection of the coast to the N.E. forms Dover point.

These cliffs are about 500 feet high; the upper third part of them is brown, and the lower portion almost white; each small projection presents the appearance of a steep cape, as it opens out in sailing along; but before the ship arrives abreast of it it is lost in the general uniformity of the coast. These two points are exceptions to this general uniformity, but it requires a ship to be near the land before even these are distinguishable.*

Soundings.—Dry Rock.—Soundings in 28 to 21 fathoms are found at 4 or 7 miles from the base of these cliffs, and no dangers lie near them, except a small dry rock, 18 miles from Culver point. There are 21 fathoms water within a mile of the shore to the N.E. of Dover point; but the soundings increase to 34 fathoms at 27 miles S.E. of that projection, on a bottom of brown sand mixed with coral and shells.

Eyre sand-patch anchorage lies about 155 miles north-eastward of Israelite bay. This place, at which there is a telegraph station, may be easily recognised by the white sand-patch, and by a peaked sand-hill covered with scrub 4½ miles inland, bearing N.E. from the anchorage. It is said that vessels with telegraph materials have ridden in safety at this anchorage during heavy weather from all quarters.

LOW SANDY POINT.—From Dover point the cliffs curve into a bight, extending E. by N. 50 miles to a low sandy point in lat. 32° 18′ S., long. 126° 25′ E., being the projecting extremity of some sand-hills, only sprinkled with vegetation, and about 7 miles eastward of Eyre sand-patch. Here the soundings are 7 fathoms at 2 and 3 miles off the shore, increasing to 27 fathoms at 12 miles farther South.

From Low Sandy point, the sandy coast, having a level summit, on which there are some shrubs and trees, extends with a slight curve to the southward rounding gradually to E. by N. ½ N. nearly 99 miles, to another low point in lat. 32° 1′ S., long. 128° 15′ E. The soundings are between 7 and 15 fathoms at 3 to 8 miles off this coast, and are tolerably regular as far as the latter point, at 2 miles to the southward of which there are 5 fathoms, increasing to 25 fathoms at 27 miles in the same direction.

Eucla Roadstead, in lat. 31° 40′ 50″ S., long. 128° 52′ 44″ E., about 260 miles west of Fowler bay, was examined by Mr. Douglas in 1867, and is said to afford shelter for shipping, being protected by off-lying reefs. The roadstead may be recognised from seaward, by its being 3 miles westward of Delliser sand-hills; and during Forest's expedition in 1870, was used as a base for recruiting the party with stores, &c. sent by sea from Perth.

GREAT AUSTRALIAN BIGHT.—The land, forming the western limit of the Great Australian bight trends from Low Sandy point

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* Flinders' "Terra Australis," vol. i. p. 23.

† Mr. H. Smidt, Master of the coaster *Grace Darling*, 1879.

N.E. by E. ½ E. 44 miles to Wilson bluff on the boundary, and is somewhat higher, but preserves the same sandy aspect until cliffs, similar to those about Dover point, and from 400 to 600 feet high, again emerge from the sand-hills, just within the boundary of South Australia. From long. 129° 7′ E., where the cliffs emerge from the sand-hills, a cliffy coast extends in nearly a straight line E. ½ N. 88 miles, with soundings in 20 and 30 fathoms at one or 2 miles off shore, when the cliffs sweep round E. by N. ½ N. 15, and N.E. 5 miles, and terminate at a sandy beach that forms the head of the Great Australian bight, in lat. 31° 29′ S., long. 131° 10′ E.

SOUTH AUSTRALIA.

The western boundary of the colony of South Australia extends along the south coast of the continent, between the meridians of 129° and 141° East, the colony contains 914,730 square miles, with a population on the 3rd April, 1881, of 279,865 persons, exclusive of aborigines.*

CAPE ADIEU.†—From the head of the Great Australian bight a sandy coast, rising gradually as it recedes into the country, trends S.E. by E. ½ E. about 60 miles to cape Adieu, at 2 or 3 miles to the south-eastward of which are two cliffy lumps like islands, close to the mainland; the coast then sweeps round in an easterly direction, 10 miles to cape Nuyts.

Rocky ledges run off these two capes, and at intervals from the shore between them ; at 2 miles from cape Adieu they extend for the distance of 2 miles. Detached sunken rocks, parts of Nuyts reefs, front the shore at one to 1½ miles off it.

This coast, from the head of the Great bight to within 7 or 8 miles of cape Adieu, is fronted by a series of beaches between rocky points, having sunken rocks extending off for a short distance.

A patch of sunken rocky ground which breaks with a heavy swell, lies N.W. by W., distant 17 miles from cape Adieu, at 2 miles from the shore, and S. by W. ½ W. from the centre of three round-topped hills.

Soundings.—In crossing the Great Australian bight, at 7 or 8 miles from the land on each side, the *Investigator* had 27 fathoms water, coarse sand and shells, and preserved the same depth while tracing the coast, at 6 or 7 miles' distance, for about 20 miles, towards cape Adieu, deepening to 33 fathoms as D'Entrecasteaux reef is approached.

Nuyts reefs.—The westernmost of these, named D'Entrecasteaux reef, which is of considerable size, and consists of two patches on which the sea breaks with a heavy swell, lies between 6 and 9 miles from the shore, and bears West, distant 10 to 11½ miles from cape Adieu. The land abreast of it is distinguished by two large and remarkable patches of bare sand 200 feet high. There are soundings in 19 fathoms water at one mile to the N.E., and 25 fathoms between this danger and the shore; 27 fathoms near its eastern side; 35 at 2 miles from its southern side; and 34 fathoms at less than a mile from its western; the water is deep, varying from 33 to 24 fathoms towards the body of the reefs, lying 12 miles to the south-eastward.

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* Whitaker's Almanac, 1883.

† *See* Admiralty chart of South Australia, cape Catastrophe to Nuyts archipelago, No. 1,061 ; scale, *m* = 0·12 of an inch.

The southernmost of these reefs, on which the sea breaks heavily, is sunken, and bear S. ½ W. 9 miles from cape Adieu, rocks varying from 43 to 20 feet in height occupy the intermediate space, at from 7½ to 3 miles from the cape, with 20 fathoms water between some of them. Captain Flinders passed between the clusters in 35 to 24 fathoms water.*

Sunken rocks on which the sea breaks, lies at 1¾ miles to the S.S.W. of the cape, and 3 miles W. by S. of it.

Montenote Isles, placed in the French chart of M. Freycinet in 32° 11′ S. and about 131° 48′ E., at nearly 18 miles off the land abreast of Nuyts reefs, are described as four small low sterile rocks, the largest being to the S.W., with 36 fathoms water at about 17 miles S.E. by S. of the isles. These isles were not seen by Captain Flinders, who passed 8 or 9 miles in-shore of the above position of them, in 30 fathoms water, unless they prove to be some of the "large rocks standing above water" that were noticed by him on the outer Nuyts reefs; this appears not at all improbable, as the French ships passed at a great distance from this part of the coast, and took their departure from it before coming abreast of cape Adieu of their chart, off which the isles are immediately situated. A ship, in passing, had better be certain of avoiding these dangers, by giving cape Nuyts and the land to the westward of it a berth of 20 or 25 miles.†

Géographe Reef, said to have been seen in the French corvette of that name in 1802, and to be in lat. 32° 40′ S., long. 132° 7′ E., was sought for without success by Mr. B. Douglas, Provincial Marine Surveyor of South Australia, in 1858.

YATALA REEF was discovered by Mr. B. Douglas in 1858, in lat. 32° 39′ S., long. 132° 30′ E.; it is nearly awash and breaks heavily, with 32 fathoms water at about 2 miles from it. This very dangerous reef should be most carefully avoided, as neither the soundings give any decided warning of its proximity, nor do landmarks enable the navigator to fix his position by bearings, when cloudy weather prevents observations from being taken.

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* Captain Flinders' "Terra Australis," vol. i. p. 99.

† "Voy. aux Ter. Aust.," par M. Freycinet, p. 140.

Casuarina Reef, reported to be in lat. 32° 40′ S., long. 132° 36′ E., and represented as of the same description, but somewhat larger than Géographe reef, was rigidly searched for by Mr. B. Douglas during a most favourable day for the purpose, but no evidence of its existence was discovered.

As Yatala reef lies nearly midway between the assigned positions of Géographe and Casuarina reefs, and nearly on the same parallel of latitude, it is reasonable to presume that Yatala reef is identical with those reported dangers, and that some error in longitude of the French navigators, who reported these reefs, may have occasioned the erroneous positions assigned to them. Nevertheless it is incumbent on all mariners in the vicinity of Yatala reef to be on their guard.

Cape Nuyts, is the high cliffy extremity of some rocky land that extends 8 miles eastward from the cliffy lumps already noticed. A pyramidal rock lies near the cape; and to the eastward of it there are two small bights, with a steep rocky projection between them; but they are both open to the southward, and encumbered with rocks, which appear to front the shore for several miles on each side of the cape.

FOWLER POINT, 7 miles to the eastward of cape Nuyts, is a cliffy projection 158 feet above the sea-level, and nearly a mile across at its broadest part, projecting 3 miles south-eastward from the general line of the coast, which is of similar elevation and formed of rocky headlands and sandy bights. A few rocks lie nearly 2 cables off the extremity of the point, and a rock awash at the same distance from its north-east side.

FOWLER BAY.—The bay extends from Fowler point in an E.N.E. direction for 10 or 12 miles to two cliffy projections appearing at that distance like an island, and which are fronted by breakers. There are 3 and 4 fathoms water at about a mile from the beach, in the bight of the bay, the depth increasing to 17 and 18 fathoms towards its steep rocky north-eastern shore. Barracouta can be caught in the bay.

Port Eyre, where a small township is established, is a very convenient anchorage in the western bight of Fowler bay, open only to the three points of the compass between S.E. by S. and E.S.E. The colonial schooner *Yatala* anchored here after a very strong wind from E.S.E., but little swell was experienced; a roll may, however, come in on the eastern part of the beach after a continuation of southerly gales; but from information received from coasters, and the appearance of vegetation close to the water's edge, it is improbable that any risk or inconvenience will be experienced in riding out a gale from any quarter in this anchorage. This is the most western anchorage in the colony of South Australia.

Telegraph.—There is a telegraph station near the beach in the bight of the bay.

Directions.—From seaward the soundings decrease somewhat rapidly from 12 and 13 fathoms towards the shore, but gradually enough to enable a vessel under command to pick up a berth without risk or difficulty.

In approaching the anchorage in port Eyre, after clearing the rocks and reef projecting from Fowler point, a berth of one third of a mile should be given to the coast, to avoid some sunken rocks lying a short distance off the termination of the rocky bank, fronting the sandy beach at the foot of the sloping hills in the bight.

Anchorage.—The best anchorage will be found in 3 to 4 fathoms water, according to the size of the vessel, in about the centre of port Eyre, with Fowler point S.S.E. to S.E. by S., and the end of the range of sand-hills at the head of the bight from W. by N. to W.N.W. The bottom is sandy and holds well outside 3 fathoms; under that depth occasional patches of limestone occur, which should be avoided.

The *Yatala* frequently anchored in 2½ fathoms, with Fowler point shut in by the rocky point forming the southern horn of the sandy bay; but vessels should keep outside that line, as, should the wind come from the eastward, there is little room for veering cable or getting under way.

Landing-place.—The best landing-place is in the north-west corner of the bay, as in the more south-westerly parts there are rocky patches, which are liable to stave a boat, if a surf should be running on the beach.

Water.—Good water may be procured by clearing out some native wells behind the sand-hills at the north-west part of the bay; but care must be taken not to dig too deeply, or the substratum of pipe clay formation may be penetrated and the water become salt. The most eligible place, in fine weather, for getting of casks, is at the eastern end of the range of sand-hills, at the foot of which are the wells.

TIDES.—It is high water full and change, in port Eyre, at noon; springs rise 5½ feet.

The COAST from the north-east extreme of Fowler bay trends nearly S.E. by E. 26 miles to Bell point; it is moderately elevated, but barren and sandy, and is divided into sandy bights by cliffy projections of whitish appearance, fronted by breakers.

SINCLAIR ISLETS.—Off Sinclair point, the south-eastern of these projections, lie the Sinclair rocks, bearing nearly W. by N. between 7½ and 10 miles from Bell point; they are four in number and small, with breakers round them, forming to the eastward a bight 2 miles wide, having in it 5½ fathoms water, on a coral bottom.

BELL POINT is low, with a small rising near its extremity, and projects 2½ miles from the coast-line, having a broad flat rock, surrounded with breakers, at 1½ miles S.S.W. of it, the rocks extending for upwards of a mile beyond it in the same direction.

Soundings.—Off this part of the coast the soundings are generally from 30 to 34 fathoms, between 12 and 18 miles off shore, but are not regular; and 20 fathoms are found at 2 or 3 miles from the rocks. They are no guide for approaching the coast; and on account of the Yatala and Géographe reefs, and the Casuarina reef (pages 54 and 55), represented to have been seen by the French, this part should not be approached in the night, or without keeping a good look-out.

NUYTS ARCHIPELAGO AND ADJACENT COAST.

NUYTS ARCHIPELAGO is contained in a large bight of the main coast between Bell point and Westall point, S.E. ½ E., nearly 62 miles from it; this bight includes several deep bays, and is the eastern extremity of the land of Australia (New Holland), discovered by Peter Nuyts, in 1627. The principal islands of this archipelago are St. Peter island, lying near the mainland, with its south-west point E. by S. ½ S., 22 miles from Bell point, and the isles of St. Francis, the largest of which lies S.S.E. 18½ miles from the point. Numerous rocks lie scattered amongst these islands, but the water is generally deep close to them, and they are safe to approach except between Bell point and Purdie islets, 4 to 6 miles south-eastward of it, where a sunken rock (Flinders rock) rises out of 9 fathoms water, upon which the swell does not always break.

ST. FRANCIS ISLES, the south-westernmost group of Nuyts archipelago, are ten or eleven in number; but only one of them, which is near the middle of the cluster, is of any considerable size, and it bears the name of the whole. St. Francis isle is about 2 miles long, N.W. and S.E., and half a mile across near the centre, where there is a sandy isthmus, connecting the two moderately high and cliffy extremities, the south-eastern and larger portion of the island being 1¾ miles across and 244 feet high.

Four small islets lie from half a mile to 2 miles off the north-east point of St. Francis isle, which are generally safe to approach, with the exception of one of them, known as Freeling islet, which has a detached rock lying N.N.W. a short distance from its northern extremity.

There are two islets surrounded by rocks, on the west side of St. Francis isle, the outer islet being distant one mile from the west point; as the sea rolls in with great violence on these islets, passing vessels are recommended to give them a wide berth.

Masillon and Fénélon isles lie respectively 2 and 3 miles to the southward of the south point of St. Francis isle; they are both similar in character, but smaller than St. Francis isle; Masillon isle being 251 feet high, and Fénélon isle much smaller and lower. A small islet and some rocks lie between the two islands.

Between St. Francis and Masillon isles there is a good channel 1½ miles wide, with 18 and 16 fathoms water in it; the south point of St. Francis isle should, however, be avoided, as a reef projects a short distance from

ERRATUM.

Page 58.—Omit lines 9 and 10 from top, after the word "it."

of the island, it is not recommended.

Supplies.—St. Francis isles generally abound in the sooty petrel and the barnacle goose, and water was found trickling down a ravine near the south-east extreme of St. Francis isle.

TIDES.—It is high water full and change, at St. Francis isles, at noon; springs rise 6 feet.

Cannan Reef, S.S.W. ½ W. 3½ miles from Fénélon isle, is a most dangerous rocky ledge, showing about 25 feet above water; breakers were also observed on sunken rocks for nearly a mile to the northward of the reef.

Hart Islet, W. ½ S. 4½ miles from Cannan reef, and discovered in 1833 by the Hon. John Hart, late Treasurer of South Australia, is a small rocky islet, 65 feet above the level of the sea. It is quite safe to approach from all directions, and is therefore an excellent guide for avoiding Cannan reef during the night, as the islet may be closely borrowed on in passing, and from thence a course shaped towards Petrel bay, should a vessel be bound thither; or if to Fowler bay, sight Hart islet to the eastward, and shape a direct course for Fowler point.

FRANKLIN ISLES,[*] E. by N. ¼ N. between 16 and 21 miles from St. Francis isle, are three in number, the central and westernmost being moderately elevated, and extending together 3½ miles E.N.E. and W.S.W.; they are about two-thirds of a mile broad, and are nearly joined together by a reef partly uncovered. The easternmost isle of the group is a mere pyramidal rock, with a reef about it; at a quarter to half a mile off the southern side of the western island, detached rocks above and below water extend for 1¼ miles in a direction parallel to the island; a few [illegible] lie close off its western and northern ends; but as the sea

it with great violence.

Evans Isle, which lies W. ½ N. 3½ miles from Flinders reef, is about a mile in length, with a reef, partly dry, extending 2 cables from its south-east extreme, close to which there are 15 and 18 fathoms water on a regular bottom, the water deepening to 21 fathoms near Flinders reef. A similar reef lies off the north-west point, and a rock also lies close off the south-west point. The island being 122 feet high, it offers at night an excellent mark for navigating in this part of the archipelago; and in shaping a course for Denial bay to the north-eastward, Evans isle forms a distinguishable object to steer for even in a dark night.

Lacy Isles are two in number, lying N.W. by N. and S.E. by S. 1½ miles from each other; the southern isle, which bears W. by S. ½ S. distant 5 miles from Evans isle, is about a mile in length. The northern islet is very small, with a reef and breakers extending E.N.E. one third of a mile from its east side, and a detached dry rock surrounded with breakers lying W.S.W. nearly one mile from the islet. The south-eastern isle is 148 feet in height, and has 15 fathoms, off its south-west point; and being similar in aspect to Evans isle, is also a good mark to steer for when shaping a course for Denial bay; but masters of vessels should be careful in not closing the north-western islet and reefs of the group.

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[*] *See* plan of Denial and Smoky bay, on Admiralty chart, No. 1,061; scale, $m = 0{\cdot}5$ of an inch.

Purdie Isles, the north-westernmost of Nuyts archipelago, lie 3 to about 4½ miles from the shore to the south-eastward of Bell point, and consist of one principal isle 83 feet high, at S.E. ½ E. 6½ miles from Bell point, with a ledge of rocks, on which there are some smaller islets, extending N.E. 2½ miles from it. A separate islet also lies eastward 2 miles from the largest isle, with 18 fathoms water between them and a smaller one at half a mile off its south end, to which it is probably joined by a reef extending from each.

Sunken Rock.—The space between Purdie isles and the mainland to the northward contains the small sunken rock (Flinders rock) westward of Bell point noticed at page 57, on which the sea breaks only at times, bearing nearly N.N.W., distant 3½ miles from the largest of these isles; there are 12 and 14 fathoms water, at 1½ miles W.S.W. of it, and 9 fathoms close to its south-west side. The navigator should prefer the passage southward of the Purdie group.

Lound Islet and Reef.—The former, which is 67 feet high, lies in the fairway of the channel leading into Denial bay at 5 miles from the mainland to the northward; midway between the islet and the reef there are 15 and 16 fathoms water, on a bottom of coarse sand and shells. The reef, which lies N. by W. 2¾ miles from the islet, and 3 miles off shore, only shows itself in bad weather, when the sea breaks heavily on it.

The COAST from Bell point extends about E. ¼ N. 18½ miles to Peter point at the entrance of Denial bay, and having three bights that are open to the southward, formed by Rocky point at 6½ miles from Bell point, and James point 8½ miles further to the eastward.

PETER POINT, which is 110 feet high, projects 2½ miles from the line of coast, with a 3 fathoms rocky patch, on which the sea breaks at times, lying S.W. ½ S. three-quarters of a mile from it. The point is rocky, but on each side the coast recedes, with sandy beaches; to the westward is an exposed sandy bay, extending 3½ miles to James point; and to the eastward the coast takes a northerly direction, forming the western boundary of Denial bay. At this point numerous harbours commence, offering the most secure anchorages and facilities for landing, or even loading and unloading cargoes on the open beaches.

St. PETER ISLAND, the north-easternmost and largest of Nutys archipelago, lies near the mainland forming Denial and Smoky bays; it is 7½ miles long, N.E. and S.W., and 3½ miles broad at its south-western part, its north-eastern extremity forming a long, narrow point, projecting 3 or 4 miles from the main body of the island. St. Peter island has a range of hillocks 140 feet in height running across its centre in an east and west direction, and on the narrow point, at 2½ miles from its north-east extremity, mount Younghusband rises to a height of 144 feet, bearing E. by S. ½ S., distant 7½ miles from Peter point. This hill may be seen at a considerable distance, and is a useful mark for fixing the position of any vessel navigating in these waters. The western portion of St. Peter island abounds, during the wet season, in vegetation of the most luxuriant description.

Anchorage.—During southerly winds secure anchorage will be found in 3 fathoms water, on the northern side of St. Peter island; but should the wind draw round to the West with any degree of strength, a heavy sea will be experienced, which would render the position of a vessel in that locality somewhat perilous.

A small rock awash at low water, having 2 fathoms water close to its north-east side, lies off the low rocky point near the anchorage.

Water will be found near the anchorage by digging in the sandy bay at the termination of the long sandy beach trending to the westward from the foot of mount Younghusband. It is necessary to dig a few feet in the sand, when the water will be found oozing through the soil. Brackish water, fit for sheep, will be found on the point to the eastward of mount Younghusband.

GOAT ISLE, so named from a few goats having been left on it by whalers, lies off the south-west extreme of St. Peter island, from which it is separated by a rocky channel, half a mile wide, but impassable for vessels. Goat isle is about 1¾ miles long N.E. and S.W., and three-quarters of a mile broad; its northern and western shores are bold to approach, except where a reef runs out a short distance from its western extreme, though not so far to seaward as to render it any impediment to the navigator, if using ordinary precaution in approaching a shore on which the sea breaks with considerable violence.

The southern side of Goat isle and the south and south-west extreme of St. Peter island have several reefs off them, some of which are above water, and generally show their position by the sea breaking on them.

St. Peter Island Shoals.—From the south-eastern side of St. Peter island a reef stretches out about 3 miles to the E.S.E. into Waterwitch channel, forming a narrow prong. At midway between the island and extremity of this reef it joins the extensive St. Peter island shoals, the southern edge of which trends from the reef in an E. ½ N. direction for about 7½ miles to a narrow spit; its extremity bearing E. by S. ½ S., distant nearly 8½ miles from mount Younghusband. From this point the edge of these shoals trends nearly W.N.W. 5½ miles, and N.N.E. 2½ miles, to a

3-fathoms spit projecting about 2¾ miles from the north-east point of St. Peter island.

The northern shore of St. Peter island is fronted by shoals, extending in a N.N.E. ½ E. direction 5½ miles from its north-western extreme to a point N.N.E. distant 3½ miles from mount Younghusband, terminating eastward at the sand-spit off the north-east point of the island.

Winds.—Land and sea breezes are experienced in Nuyts archipelago during the summer months; the sea breeze setting in from the S.E. usually about noon, after a few hours' calm or light winds, and veering at night to the N.E.

Tides.—There is little tide amongst the islands of Nuyts archipelago worthy of notice, and the islands lie too much in a bight for there to be any currents.

DENIAL BAY, which extends from Peter point E. by S. 15 miles to cape D'Estree, with St. Peter island nearly dividing it in two, has four smaller bays in it, affording most secure anchorages for loading and discharging cargoes.*

Tourville Bay.—The entrance of this bay extends from Peter point N.E. by E. 4 miles to cape Beaufort, close off which there is a rock awash at high water; and from the entrance the bay runs in nearly 7 miles to the north-westward, forming several small bights and creeks. Tourville bay is mostly occupied by sand or mud-flats, leaving only a channel about half a mile to a quarter of a mile wide, near the south-west side, carrying from 3½ to 1½ fathoms water from the entrance to about 4 miles north-westward of it.

Davenport is an opening in the mangroves at N.N.W. 3 miles from Peter point, leading into a creek which runs in nearly 3 miles to the westward. There are only 8 feet at low-water springs on the bar at the entrance of this creek; but for any small vessel requiring a refit or water Davenport will be found a very eligible anchorage. The best and most convenient berth is at about 150 yards above a small mangrove islet on the south-east side, and the deepest water will be found on the south side of the creek; but, from its narrowness, it is necessary to moor. Soundings of 2 fathoms at low-water springs, may be carried up about a mile beyond the anchorage recommended, but there is no object in leaving that of the creek which is nearest the watering-place.

Directions.—The first available anchorage on entering Denial bay from the westward will be in 3½ fathoms water, fine sand, in the entrance of the channel leading into Tourville bay. To enter this channel, after passing Peter point, bring it to bear West, and cape Beaufort N.E. ½ N., when the former point will be distant about one mile. From this position steer about N. by W. ¾ W., keeping a good look-out for the banks on either side, and paying attention to the soundings. As Lound islet is brought in line with Peter point the soundings will decrease rapidly and become very irregular, until the islet is shut in with the point, when the bottom becomes more even, and a berth may be easily picked up in 3½ fathoms water, on a fine sandy bottom, with Peter point bearing S.W., and the Mangrove point at the entrance of Davenport N.W. ½ W.

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* *See* plan of Denial bay, on Admiralty chart, No. 1,061.

On proceeding 2 miles farther up this channel a small vessel may proceed over the bar into Davenport. Two sandy spits project beyond the line of the western bank to some extent, but they may be easily avoided by keeping a good look-out from aloft, from whence the discoloured water on the shoals will be readily observed.

After passing the entrance of Davenport, the channel trends more westerly, and becomes shallow, until at length this apparently fine bay terminates in a lagoon, dry at low water; at high water there may possibly be some boat channels in it.

Water, of good quality, may be procured by digging at the foot of some sand-hills on the coast to the southward of Davenport; a post was placed to mark the position of these wells, from which Peter point bears S.E. by E. ¼ E., and Lound islet S.W. ½ S. These wells, called by the natives *Cowie Yalkeena*, must not be dug too deeply, as the water would become salt. A boat may, at high water, go up the creek near the anchorage, to within one-third of a mile of the wells, but it is difficult to procure more than 200 gallons a day by this mode. If the weather be fine enough to allow a vessel to approach the coast in the bay to the westward of Peter point, and the surf be not too high for landing, water may be procured rapidly.

Aspect.—In the vicinity of Davenport the land is generally sandy, with abrupt hills of the same description ; but there are a few flats, with richer soil, between the creek and the coast, which may be fit for cultivation. On the east side of Tourville bay the country appears promising, and good tracts of grass land, affording fine pasturage, were observed; but from repeated inquiries of the natives, and Mr. Douglas' personal observation, water is evidently scarce.

Directions.—On leaving Davenport, and observing the same precautions as when entering, a good mark will be found by keeping a remarkable reddish cliff on St. Peter island S.S.E. until Lound islet opens from Peter point, when all danger will be passed. With Peter point bearing West, distant one mile, an E. by N. ½ N. course may, in a small vessel, be shaped for Yatala channel, which leads to Murat bay, the northernmost bight in Denial bay.

Bird Rock and Shoals.—Bird rock is a granite reef lying E. ½ S. 3½ miles from cape Beaufort, and the same distance W. by N. ½ N. from cape Vivonne, and being awash at high-water springs, a pile of stones surmounted by a beacon was erected on its south-east end. It is situated at the south-east bend of a sand-bank 2 miles in length N.N.E. ½ E. and S.S.W. ½ W. and one mile broad, which dries at low-water springs. Bird shoals, which dry in some places at low water, extend from cape Beaufort across to cape Vivonne, and give perfect shelter to the coast within them.

Yatala Channel, which is 4 miles in length, is bounded to the southward by the north edge of St. Peter island shoals, and to the northward by Bird rock shoals; it is one mile in width at the entrance and contracts to a quarter of a mile abreast of Bird rock; the depth of water in the channel ranges from 5½ fathoms to 3½; on the south side of the channel the water shoals somewhat gradually to 3 fathoms, when the bank is steep-to. The rock being passed the soundings become irregular, but at nearly all times of tide a vessel drawing 12 feet will be able to find a safe navigable channel to any part of Denial bay, which may be safely approached by paying ordinary attention to the lead and chart.

For large vessels, however, as Yatala channel is somewhat confined and the water shallow, except at high water, it will be necessary to approach Murat, and the adjacent bays from the southward, by the Waterwitch channel and Smoky bay, to be hereafter described.

North Channel is a narrow passage leading into Murat bay, by keeping on cape Beaufort side, tolerably near the mainland; but as it is in some parts very shallow and tortuous, and the south-west swell rolls in heavily at its entrance from seaward, this channel cannot be recommended.

MURAT BAY.—From cape Beaufort the coast trends N.E. by N. 2½ miles to a rocky point forming the west side of the entrance of Murat bay, which is 2¾ miles wide between the point and cape Thévenard, a long rocky projection, lying E.N.E. 4¾ miles from cape Beaufort. Westward of the cape there is a basin one mile wide, with 4 fathoms water, forming the eastern entrance into Murat bay from Yatala channel. Within the entrance the bay expands to 4½ miles in width, East and West, and extends 4 miles northward from the northern edge of Bird rock shoals, having soundings in 5 to 3 fathoms, and affording secure anchorage.

Cape Thévenard to Cape Vivonne.—Between cape Thévenard and cape Vivonne, S.E. by S. 3½ miles from it, is another bay with 4½ to 3 fathoms water in it, similar in character to Murat bay, and in which cargoes may be landed, or shipped from the beach, in ordinary weather.

From cape Vivonne the sand-spit off the north-east point of St. Peter island bears S.E. by E., distant 1½ miles, the intermediate channel being about half a mile wide, with 2 to 2½ fathoms water. A few rocks lie a short distance off the cape, and as the sand-spit is very narrow and steep-to it should be avoided.

DÉCRES BAY, between capes Vivonne and D'Estree, is 5¼ miles across; the shore extends from cape Vivonne, E. ½ S. 3 miles, to a low point with rocks close off it, about 3½ miles to the eastward of the north-east point of St. Peter island, and then S.S.E. ¼ E. for the same distance to cape D'Estree; the bay, which is 1½ miles deep, has 5 to 3½ fathoms water in it, and affords very good anchorage for vessels; and being sheltered by St. Peter island shoals to the south-westward, produce may be shipped from, or cargoes landed on the open beaches without risk or difficulty, in moderate weather.

Cape D'Estree, the north-western point of Smoky bay, is 100 feet high and bold to approach, and should be kept sufficiently close to avoid the long south-east spit of St. Peter island shoals, which lies South one mile from the cape.

Eyre Isle, of which the north-west point bears S. by E. ¼ E., distant 5¼ miles from cape D'Estree, is a mere bank of sand, 4½ miles long, W.N.W. and E.S.E., and 1¾ miles across at its broadest part, having a few sand-hills 25 feet in height on its western coast. Several parts of the island are intersected by muddy creeks, and stunted vegetation clothes its unpromising soil. A smaller isle lies close off the west point of Eyre isle.

EYRE ISLE SHOALS, and REEFS.—Eyre isle and the islet near its west point are surrounded by extensive shoals; from a sand-patch which nearly dries at 3 miles northward from the north-west extreme of Eyre isle the outer edge of these shoals, under 2 fathoms water, trends S.W. by S. 4½ miles, and S. by E. ½ E. 2¼ miles, and thence rocky ground which breaks at intervals, in an E.S.E. direction 7½ miles to the mainland, at 4 miles southward of cape Missiessy; and from the same sand-patch the outer edge under 2 fathoms extends eastward 3½ miles, and then S.E. by S. nearly 4 miles, to within 1½ miles of the cape, there joining the flat which fills up the southern bight of Smoky bay.

Between the south-east point of Eyre isle and cape Missiessy, half a mile south-eastward of it, is a false channel, but there is a bar outside with not more than 6 feet water on its deepest part.

From the west point of Eyre isle, sand-banks and reefs extend about 4½ miles to the south-westward to within 2 miles of the eastern Franklin island, and are mostly above water or awash at high water; the passage eastward of Franklin isles is not recommended to strangers.

WATERWITCH CHANNEL, which leads into Smoky bay from the south-westward, offers the best and safest access to the fine harbours already described, and with ordinary care may be made available under almost any circumstances.

This channel is bounded to the southward by the reefs just noticed, and the north-west and northern edges of Eyre isle shoals; and to the northward by the long reef running out from the south side of St. Peter island and the southern edge of St. Peter island shoals. It is fully 5 miles wide between the reefs off the west point of Eyre isle shoals and that projecting from St. Peter island, having 5 to 7 fathoms water for a width of 3½ miles, and is half a mile wide, with 3 to 4 fathoms water in the narrowest part, between the sand-spit, projecting from Eyre isle and the south-east part of St. Peter island shoals, the deepest water in this part of the channel being on the northern side.

Directions.—To enter Waterwitch channel from seaward care must be taken by attention to the chart, keeping the lead going and a good look-out from aloft, to avoid the reefs between Franklin and Eyre isles and Eyre isle shoals, on the south-east side of the channel, and to give a good berth on the north side to the long reef and shoals extending from St. Peter island, as the westernmost of these dangers is exposed to the ocean swell, which would soon prove fatal to any vessel unfortunate enough to strike on them. Having brought cape D'Estree to bear N.N.W., do not bring it to the northward of that bearing until the eastern end of St. Peter's island shoal is passed, when a course may be shaped for Denial bay; or continue on eastward if going to Smoky bay.

In beating in through Waterwitch channel, from seaward, attention to the soundings and a good look-out will be all that is necessary to show the navigator when to tack.

To leave Waterwitch channel, a vessel should be in mid-channel, between the two spits in the eastern entrance, and from thence, if the wind be fair, she should steer south-westward, so as to leave the Franklin isles 2 or 3 miles to the southward.

In working out against a head wind, wait for the ebb stream, which runs out at the rate of about 2 knots, and make short tacks in mid-channel, until the channel widens.

Tides.—It is high water, full and change, in Denial bay, at 0h. 50m.; springs rise 7 feet.

SMOKY BAY extends nearly S.E. 18 miles from cape D'Estree, and is 8½ miles across from Eyre isle to the mainland, with a clear entrance of more than 3 fathoms depth one mile wide from Décres bay, and half a mile wide from Waterwitch channel. Laura bay is a small shallow inlet in its northern bight, E.N.E. 2½ miles from the cape, and the southern bight is occupied by shoals extending 3½ miles from the shore, and continuing about 2 miles northward along the eastern shore of the bay.

Smoky bay, in which there are 5 to 3 fathoms water, affords excellent anchorage, according to a vessel's draught, in any portion of its extensive waters, the only caution necessary to observe being a due regard to the lead, which gives most reliable warning in approaching the shoals that border the north-east side of Eyre isle, and extend in some parts nearly 2 miles from the shore.

The COAST.—From cape Missiessy, the south point of Smoky bay, the coast trends S. by W. 7 miles to Dillon point, between which and Brown point, 3 miles to the southward of it, is St. Mary bay, a small exposed bight, which, together with the coast 2 or 3 miles farther to the northward, is fronted with breakers. A wide berth should be given to this part of the coast.

BROWN POINT,* which forms the north-west extreme of Streaky bay, is a sandy projection 115 feet high, and has two small rocks close to its extremity, with breakers surrounding them, and extending to those along the shore to the northward. The soundings are 24 fathoms at 2 miles to the westward, and 23 fathoms at 3 miles to the southward of it; and to the eastward the water shoals from 9 to 6 fathoms for about 9 miles into Streaky bay.

STREAKY BAY, the entrance of which, as before stated, extends from Brown point to cape Bauer, is considered one of the finest harbours on this part of the coast, the only dangers to be avoided in approaching the entrance being Olive isle, with the reefs and rocks about it; and in the north-west part of Streaky bay lies a dangerous patch of rocks about one cable in diameter on which the sea breaks heavily at times; the least water obtained on it was 5 fathoms with 14 to 18 fathoms at a distance of half a mile around. From the centre of this patch of rocks Brown point bears N.W. ½ W. 4½ miles, and the hill on De Mole point N.N.E. ¾ E. 6¾ miles. The bay is 15 miles deep, its eastern or inner portion being protected from seaward by a barrier of sand-banks extending northward and north-westward from the south to the northern shore of the bay. This portion is available for vessels drawing not more than 18 feet water. There are three channels between these banks leading into the spacious harbour within them, which will be easily found by paying attention to the chart, which combined with attention to the lead and a good look-out are about the best guides for navigating the bay.

Dashwood rock, near the centre of Streaky bay, on which the sea breaks only with a heavy swell, is about 50 feet in diameter, and has 9 feet water with 6 to 7 fathoms at a quarter of a mile around. From the centre of this rock the west extreme of cape Bauer bears S. ¼ E. 6 miles; centre of Olive island S.W. by S. 7½ miles; and hill on Eba island E. by S. ¼ S. 11 miles. This rock lies in the track of vessels approaching Dashwood channel.

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* *See* plan of Streaky bay, on Admiralty chart, South Australia, cape Catastrophe to Nuyts archipelago, No. 1,061; $m = 0 \cdot 5$ of an inch.

Collinson Point, a projection of the north shore of Streaky bay, lies 2 miles eastward of Brown point, and like it, is fronted by rocks on which the sea breaks heavily. The northern shore of the bay from Collinson point curves round north-eastward and eastward to De Mole point, forming Gascoigne bay, from a low point in the bight of which rocks run off half a mile to the south-eastward.

De Mole Point, N.E. by E. ¾ E. 5½ miles from Collinson point, is 102 feet in height, having a hummock near it, which at a distance appears like an island, and is a remarkable object on the coast-line; rocks awash at half tide project from the point three-quarters of a mile in a S.S.W. direction, and from thence they extend along shore towards the bight of Gascoigne bay.

North Shore.—From De Mole point the northern shore of Streaky bay trends N.E. ¾ N. 3 miles, and from thence 2½ miles eastward to Lindsay point, a low projection, on the east side of which is Acraman creek.

The northern shore of Streaky bay, from De Mole point to about 1¾ miles eastward of Lindsay point, is fronted by shoals. From the rock awash off De Mole point the edge of the shoal runs E.N.E. 3½ miles, and then southward 2 miles, forming a bight 3 miles across and 2 miles in depth, having 4 to 4¾ fathoms water in it; thence the edge of the shoal extends E. ½ S. nearly 2 miles to the southern spit at 3¼ miles S. by E. from Lindsay point, it then trends N.E. one mile, forming the north-west side of Warburton channel, and thence northward to its junction with the general line of shoal water along shore to the eastward of Lindsay point.

CAPE BAUER.—S.E. ¼ E. 15 miles from Brown point, is a cliffy projection of the mainland, attaining an elevation of 295 feet at a little way back, its summit being covered with scrub, and forming the south-eastern point of Streaky bay; breakers extend three-quarters of a mile from the north side of the cape.

Olive Isle.—West 4½ miles from cape Bauer, does not exceed a quarter of a mile in diameter, but is 82 feet high; reefs extend E.N.E. 2 miles from the isle, and there are dangers at a mile to the southward and westward of it, besides other straggling rocks at a short distance to the northward. Some of the rocks to the eastward of Olive isle are always above water, and tend to show the approximate distance the reef ds from the island; as, however, the sea almost invariably breaks on these reefs, no prudent seaman need anticipate either difficulty or danger in approaching the island within a reasonable distance.

There is a good passage between the eastern reefs of Olive isle and cape Bauer, by borrowing towards the cape, the depth quickly increasing to 23 fathoms southward of the passage. At 2 miles to the westward of the island there are 27 fathoms, and the depth varies between 30 and 34 fathoms at the distance of 17 miles in the same direction. From the rocks and reefs about Olive isle to the centre of Streaky bay the soundings decrease gradually from 20 to 6 fathoms.

South Shore.—From cape Bauer the coast trends N.E. 1¼ miles to the reef projecting northward from the cape, and from the reef E. ¾ S. 7 miles to Gibson point, a long narrow point, forming the east extreme of Gibson peninsula. This, the northern coast of the peninsula, is fronted by a sandy flat, averaging half a mile in breadth, and terminating in a spit that projects a mile from Gibson point.

South Channel is a swashway across the shoal which connects the South sand with Gibson peninsula. It is 1½ miles wide, having 15 feet water in places, and as little as 10 feet in others.

Directions.—In approaching South channel from seaward, after having cleared the reef projecting from the northern part of cape Bauer, stand in so as to shoal the water near the edge of the flat extending from the north side of Gibson peninsula, until the centre of Eba isle—which lies N.E. ½ N. 4 miles from the east point of the peninsula—bears East when a course for that island may be steered, keeping the lead going, and a good look-out from aloft to observe the banks, which discolour the water very distinctly, this will take a vessel through the swashway in from 12 to 15 feet at low water.

When the low east point of Gibson peninsula bears S.S.E. all danger will be passed, and the vessel may anchor in from 4 to 6 fathoms water, in Spithead, or proceed southward into Blanche port.

South Sand is a projection eastward from the general line of shoal barrier extending across the bay, which partly dries at low water, and lies between South channel and Dashwood channel to the northward of it, is 6 miles long, East and West. Its eastern extreme, which approaches within 1½ miles of the mainland, forms a spit, from which the centre of Eba isle bears S.S.E., distant 2½ miles, and Perlubie, a remarkable white sand-hill near the coast, E. ¾ N. about 1¾ miles.

DASHWOOD CHANNEL, the safest of the three passages, is bounded to the southward by South sand and to the northward by North sand; it is barely a mile wide in its narrowest part, and the soundings vary from 2½ to 5 fathoms.

Directions.—Dashwood channel may be easily entered from seaward by bringing Olive isle to bear S.W. ½ S. and the extremity of Brown point W. by N. If from the northward or westward taking care to avoid the 5 fathoms rocky patch at 3½ miles southward of Collinson point and Dashwood rock, or if from the southward the latter rock. From this position, keeping a good look-out for the discoloured water on the banks, steer E. ½ S. for the sandy shore of the bay; by keeping on this course until Perlubie hill bears E.S.E. the course may be altered to that bearing. On the centre of Eba isle bearing S. by E. ½ E., the east spit of South sand will be cleared, and a southerly course may be steered for Spithead or Blanche port. As the spit is very steep-to, it should be carefully avoided.

North Bank, which dries in places, lies between Dashwood channel and Warburton channel to the north-westward, it extends 4 miles North and South, and nearly the same distance East and West.

Warburton Channel, the northernmost and widest of the three passages leading into the harbours of Streaky bay, is 1½ miles wide between the north-west side of North sand and the sand-spit between De Mole and Lindsay points, and has 3 and 6 fathoms water in it.

Directions.—To enter Warburton channel from seaward, looking out to avoid the same two dangers that are in the way when approaching Dashwood channel, bring cape Bauer to bear South and Collinson point West; and from this position steer N.E. with a fair wind; if with a beating wind, the lead will give good warning as the banks on either side are approached. After having brought a remarkable reddish cliffy projection of the coast to bear N.N.E and having cleared the sand-spit on the north-western side of the channel, the vessel may anchor in 6 to 4 fathoms water, or where most convenient, in a spacious roadstead, extending from the North sand N.N.W. 4 miles, and E.N.E. the same distance from the sand-spit on the north-west side of Warburton channel, to the mainland.

ANCHORAGES in Streaky Bay.—Under shelter of the shoal projecting from Lindsay point there is very good anchorage with all winds, and as a harbour of refuge there is perhaps none more easy of excess. On the adjacent coast cargoes could be landed, or produce shipped from the open beach, in ordinary weather, without risk or difficulty.

Between the north-east point of North sand and the mainland there is a passage across the neck which joins the North sand and the mainland nearly half a mile wide, with 13 feet water, leading in the direction of Perlubie from the spacious roadstead just described to the northward; but as the eastern point of North sand is very steep, the passage is only fit for small vessels.

From the east side of this passage the eastern shore of Streaky bay trends S.E. by S. 7½ miles from Perlubie, and from 2 miles southward of the passage, may be approached in 4 fathoms water within half a mile of the beach. Between this beach and the sand-banks fronting it there is another extensive roadstead, with a uniform depth of 4 to 6 fathoms, into which Dashwood channel leads from the westward.

Spithead is the largest sheltered harbour in Streaky bay; near the centre of this harbour, at 1½ miles W. by S. of Eba island, there is a patch nearly three-quarters of a mile in diameter, having from 3¾ to 4½ fathoms water on it. There is a channel nearly 1¼ miles wide, with 6 to 4½ fathoms water, between Perlubie and the east spit of South sand, leading from the northward into Spithead, where there are uniform soundings in 5 to 6 fathoms over nearly the whole space. Vessels not intending to enter Blanche port will here find very good anchorage in 5 or 6 fathoms, with Perlubie hill bearing N.E. and the centre of Eba isle from S.E. by E. to East. A vessel in this position will be sheltered from all winds and will be in perfect safety, with plenty of room to get under way, with the wind from any quarter.

Eba Isle is one mile long, E.S.E. and W.N.W., and nearly three-quarters of a mile broad; it is 85 feet in height, and lies about one-third of a mile from the east shore of Streaky bay, with which it appears to be connected; a rock above water lies about three-quarters of a mile to the southward of the island.

Blanche port is a deep indentation forming a most secure harbour in the southernmost part of Streaky bay. Its entrance is half a mile wide between the eastern shore of the bay and the spit projecting from Gibson point the low east point of Gibson peninsula; but it is divided into two passages by Fairway rock, lying S.S.E. ½ E. one mile from the east point of the peninsula, and E. ½ S. 1¼ miles from a small perforated rock near the shore, bearing S.W. ¾ S., distant one mile from the point. The eastern channel is the best. Between the perforated rock and the point a creek runs into the peninsula 2½ miles in a W. ½ N. direction. From Fairway rock in the entrance, the port extends about S.S.W. 3¼ miles, and is 2 miles across at its widest part, the depth of water varying from 4½ fathoms near Fairway rock to 2 fathoms at the head of the port.

Sponge Rock with 5 feet water and 3 fathoms close around, lies on the west side of the anchorage in Blanche port, southernmost part of Streaky bay. From the centre of this rock Gibson point bears N. ¾ E., and Crawford landing E. by N. ½ N.

Directions.—To enter Blanche port from Spithead and avoid Fairway rock in the entrance, bring the northern portion of the sand-hills at Perlubie in line with the western end of Eba isle; and after having passed between the rock and the eastern shore, the chart and lead should be consulted to lead up to the anchorage in the middle of the port in 3½ fathoms water.

The depths on approaching the head of the bay become somewhat irregular, but a good berth may be picked up for a vessel drawing 16 or 17 feet, within about two-thirds of a mile of the beach; vessels of lighter draught may proceed towards the head of the bay into their own draught of water, within 2 cables of the shore.

When leaving Blanche port it will rarely happen that a leading wind will have to be long waited for in ordinary seasons, as the sea breeze generally sets in in the afternoon.

Flinders Town is on the shores of a pleasant land-locked bay, at the head of Blanche port. It is a telegraph station. There is a small establishment for preserving oysters in tins. Population in 1881 was 111.

Rescue from Shipwreck.—In the event of a vessel being stranded in or near Streaky bay, and the lives of the crew being in danger, assistance will if possible be rendered from the rocket station established here.

Water—Supplies.—An abundant supply of excellent water may be obtained at Perlubie, in the hollow of the sand-hills, within 150 yards of low water mark. It is necessary to clear out the wells to obtain a supply, but care should be taken not to dig too deeply, so as to penetrate a clayey substratum which holds the water.

At high water, by means of a hose, casks may be filled in the boats, as the shore is generally free from surf; but at times during strong gales from W.N.W. it may be found difficult to water. From the protection afforded by the sand-banks the ocean swell has quite subsided before reaching this portion of the bay.

Oysters of excellent quality, and unlimited in quantity, may be obtained by taking advantage of the low tides which leave the banks uncovered in some places.

Aspect.—In the vicinity of Streaky bay the sand is of excellent quality; and there is no finer sight on the whole coast for a township than the head of Blanche port.

TIDES.—It is high water full and change, in Blanche port, at 0h. 5m.; springs rise 6 feet.

The COAST.—From Streaky bay to Venus harbour the coast has several open bays, with long reefs off nearly every point; behind some of these there is said to be anchorage for small vessels.

Westall Point.—Westall point, South 11 miles from cape Bauer, is a bold cliffy headland, somewhat higher than the cape, with rising land towards the interior. The coast from the point trends N.E. ½ E. 2¼ miles to a cliffy projection, close off which are some remarkable reddish-coloured rocks. Mount Westall which rises to an elevation of 315 feet bears E.N.E. distant 2 miles from the point.

CORVISART BAY, which extends from cape Bauer to Westall point, is 11 miles across and about 3½ miles deep; it is mostly skirted by a sandy beach, exposed to the westward, but it appears capable of affording shelter from southerly winds, round the north side of Westall point, off the reddish-coloured rocks just mentioned.

SCEALE BAY.—From Westall point Sceale bay extends S.E. by S. 8 miles to cape Blanche, it is about 5 miles deep, the soundings shoaling from 27 fathoms at its mouth to 5 and 6 fathoms off the sandy beach at its head; this bay is also open to the S.W., although coasters report anchorage under some rocks to the south-eastward of Westall point.

CAPE BLANCHE, the south-eastern point of Sceale bay, and which is similar to Westall point, has a small sandy bay on each side of it, and a reef of rocks extending from its southern extremity. There are 30 fathoms water at 3 or 4 miles from this part of the coast, and the water appears deep close to the rocks.

A rocky patch with 10 fathoms water on it lies W. by S. ½ S. 7½ miles from cape Blanche.

CAPE RADSTOCK.—From cape Blanche the coast, which is somewhat embayed, takes a south-easterly direction to a point at N.W. ½ W. 4½ miles from cape Radstock, a bold cliffy headland, in lat. 33° 12′ 15″ S., long. 134° 19′ 30″ E. This cape, which is of a wedge-like form, and 477 feet high, may be distinguished at a considerable distance; and being one of the most remarkable projections on this part of the coast, it is an unmistakeable guide for vessels bound either to Streaky bay or standing in from seaward, towards Venus harbour, to the eastward.

The land to the northward of cape Radstock becomes gradually lower towards cape Blanche, and also for about 2½ miles north-eastward to Beard bay, a shallow inlet barred by rocks and running in north-westward for 10 miles behind cape Radstock.

ANXIOUS BAY, formed between cape Radstock and Waldegrave isles, 33 miles to the south-eastward of it, is 12 miles deep, but is much exposed to all westerly winds, except in its southern part, from those to the southward of S.W., and affords no secure anchorage. The northern shore of Anxious bay trends from Beard bay north-eastward 3½ miles and then south-eastward 7 miles to a peninsula, which extends about 5 miles farther south-eastward to Weyland point, its south extremity. From eastward of Beard bay towards Weyland point the coast gradually increases in height, and is fronted by rocks, and from its ironbound shores presents a most inhospitable aspect; no outlying dangers, however, have been observed. The soundings between the cape and the point are generally about 30 to 28 fathoms.

There are 26 to about 30 fathoms of water at 3 or 4 miles from its shore in all parts, except the south-east bight of the bay, where there are 7 to 11 fathoms on a sandy bottom, at one to 2 miles off the beach, and the same depth at half a mile off the north side of the inner and largest Waldegrave isle, which is the easternmost of the Investigator group. Vessels using this anchorage should be prepared for the wind coming from the northward, as the reefs which connect Waldegrave isles with the mainland would prevent escaping to the southward in that direction.

Weyland Point is a remarkable cliffy headland in Anxious bay, similar to cape Radstock, from which it bears E. ¾ S., distant 15 miles. It is 293 feet high, and forms a good mark for making Venus harbour, a small port, the entrance of which lies N.E. 1¾ miles from the point.

Danger.—Howard rock, with deep water round it, lies S.W. at a quarter of a mile off Weyland point. The sea breaks with great violence on the rock in bad weather; but at high water, when the sea is smooth, this danger may be approached without its being perceived.

VENUS HARBOUR.—At N.E. by E. 1¾ miles from Weyland point, is an opening in the coast-line leading into Venus harbour. The soundings here rapidly decrease from 16 to 6 fathoms at a little over a mile from Westall point, and then in a few casts from 4 to 3 fathoms on a rocky bar, on which the sea breaks heavily in ordinary weather. The tide rushes out with such force that on the smoothest days the entrance is one mass of confused breakers. The fairway into the harbour is exactly between two headlands, which are of little elevation, and lie nearly North and South, about 2 cables from each other, with 10 to 17 feet water across. There is a rocky ledge on the north side of the entrance, in the direction of a small sand-hill on Germein islet, which lies nearly a mile within, and faces the entrance; and from the southern head, which forms the north-west point of the eastern peninsula, another ledge projects a short distance towards the bar.*

Venus harbour is 9 miles long, E.S.E. and W.N.W., and nearly 3 miles across at its broadest part, with some small islets in it and several points and sand-spits projecting from the southern shore, which divide the harbour into three branches, all of which are only navigable for boats or small craft at high water. There is a wooden jetty 535 feet in length with a depth at low water of 9 feet at its outer end.

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* *See* Admiralty plan of Venus harbour, No. 1,066; scale, $m = 2$ inches.

There is a township named Parkin on the east side of the harbour, at three-quarters of a mile from the entrance, but most of the trade has gone to Waterloo bay, which is much easier to enter or leave than Venus harbour.

DIRECTIONS.—Provided the weather is moderate and the wind fair, with the flood stream, no vessel of less than 10 feet draught need apprehend danger in running for Venus harbour; and after having passed Weyland point and avoided the rocky ledge off its extremity, a course may be steered for the entrance, when, the soundings will rapidly decrease from 16 to 3 fathoms. Having run in betweeen the heads, haul round to the eastward, avoiding the rocky ledge lying in the direction of the sand-hill on Germein islet, and anchor where directed, or as most convenient.

With the aid of the plan, and by keeping a good look-out from aloft, the sand-spits may be easily avoided; and in entering the harbour with a strong flood stream and fair wind, it will be necessary to get the sail in as soon as possible, as there is very little space between the heads and the anchorage.

No stranger should run for Venus harbour in bad weather or on the ebb, when there is any swell on the coast, as the whole entrance at such times is a mass of breakers; neither should an attempt be made to pass the bar with a light or baffling wind, as the least mistake, or loss of command over the vessel, might throw her on the ledge projecting from the southern head towards the bar, from which position it would be quite impossible to rescue the vessel, or in all probability the crew.

A stranger, however, might in moderate weather approach Weyland point and observe if the sea breaks on the detached reef already mentioned, as lying off that headland. Should there be no surf there, the bar is practicable with a fair wind and flood stream. In the event of its not being found advisable to attempt the passage, the vessel may be kept off and on; but it is more safe to proceed at once to the anchorage under Flinders isle, in the south-eastern end of Anxious bay, which is a convenient stopping-place to await an opportunity for entering Venus harbour.

To leave Venus harbour the same precautions must be observed as in entering; and when the tide serves in the morning it will be generally found the most advantageous time for sailing; as the land wind in fine weather mostly blows with sufficient force to give a vessel good steerage-way during that part of the day.

Anchorage.—There is good anchorage in 3 to 4 fathoms water, anywhere within the entrance, the best being between the eastern peninsula and a sand-spit, which divides the channel into two directions, one branch leading to the northward, where it soon becomes shoal, and the other to the eastward, which also gets shallow as it is ascended.

Water.—In the vicinity of Venus harbour there are fine pastoral districts, and water can be procured at a place named Cheriroo.

TIDES.—It is high water full and change, in Venus harbour, at 1h. 30m.; springs rise 4 to 5 feet.

CAPE FINNIS.—From the opening leading into Venus harbour, the eastern shore of Anxious bay trends south-easterly 9½ miles, whence southward and southwestward for 16 miles to a point, at 2 miles to the southward of which is cape Finnis, with a shoal rocky bight between them. The coast is generally of moderate elevation and sandy, with lake Newland extending about 10 miles close along behind the shore, midway between Venus harbour and Waldegrave isles.

Aspect.—From the south-east shore of Streaky bay a range of hills takes a S.S.W. ½ W. direction to about 6 miles eastward of Westall point; thence it nearly follows the trend of the coast to about 5 miles north-eastward of cape Blanche, and then sweeps round eastward to mounts Hall, 638 feet high, and Cooper, the former bearing N.E. ¾ N., distant 11½ miles, and the latter N.E. by E. 22 miles from cape Radstock. From mount Cooper the range takes an East and S.E. direction to mount Southam, which bears E. ¼ N., distant 20 miles, from Weyland point; the range then trends south-westward and southward, and terminates at Bramfield hill which is 634 feet high, and about 9 miles eastward of Waldegrave isles.

INVESTIGATOR GROUP, of which the eastern and larger Waldegrave isle forms the easternmost, consists of several islands and rocks extending about S.W. ½ W. 37 miles from cape Finnis.

Waldegrave Isles.—The larger isle, which is about 1¾ miles long, East and West and 120 feet in height, is connected with the rocky bight North of cape Finnis, and also with the smaller isle, one mile to the westward, by reefs, which for a vessel anchored in the south-east bight of Anxious bay would admit of no escape southward between these isles and the mainland, should the wind veer round and blow from the northward.

The Watchers are two small islets 24 feet above the sea, lying in line with Waldegrave isles, between 2 and 3½ miles westward of the smaller island; there are 27 fathoms water at 2 miles from these breakers in all directions except to the eastward; and a clear channel 5½ miles wide, with 25 to 30 fathoms, between these breakers and Flinders and Top-gallant islands, to the south-westward.

FLINDERS ISLAND, the largest and most central of the Investigator group, is 7 miles long, N.E. and S.W. and 3 miles broad at the centre and a little over 200 feet in height; it forms nearly a square, with the south-western angle projecting farthest from the main body of the island. Rocks project from the points of the island, the intermediate sides being slightly embayed; but the eastern side alone offers good anchorage, although Captain Flinders in 1802 anchored the *Investigator* on the north side of the island.

The north side of Flinders island has sunken rocks scattered about at from one to 2½ miles off it, and the north-western side to the distance of 6 miles is studded with reefs of a most dangerous nature, and should be most carefully avoided. The western side of the island is quite open to the ocean swell, whilst the south-east side offers no anchorage, the coast being rocky and the water generally too deep close in shore to offer any inducement to seek shelter in that locality.

Anchorage.—The East side of Flinders island may be approached with safety, taking care, however, to avoid a reef of rocks—on which the sea generally breaks—lying about 2 cables from the beach near the east point of the island, from which the reef is separated by a passage, having 3 and 4 fathoms water in it.

Directions.—The reef just described may be easily avoided by approaching the anchorage from the north-eastward, and standing along the beach until a berth is picked up inside the reef, in 3 or 4 fathoms water. This anchorage, though available for small craft in gales from N.W. round by West to S.W., should not be resorted to in an easterly gale, as a vessel would be very close in before she could be fairly got under way, with the beach as a lee shore.

Caution.—No large vessel should at any time attempt to anchor within the reef, but rather seek shelter farther to the northward, so as to have a clear course before her, in the event of bad weather coming on from north or north-eastward.

The Landing-place on the beach under the reef, although sheltered to a certain extent, is sometimes difficult and unsafe, as the surf occasionally rolls in with considerable force.

Supplies.—There is very good pasturage on Flinders island, and a sheep station has been established. Vessels frequenting the island will be able to procure mutton from the shepherd, who will also point out the position of the wells, which are near the anchorage.

Top-gallant Isles lie E. by N. 3 miles from the east point of Flinders island, and consist of an island 330 feet high, with three rocks, resembling ships under sail, off its east side; the whole being of small extent, and connected by a reef, with 25 to 30 fathoms water all round them, at the distance of 2 or 3 miles, except in the passage between them and Flinders island, where the depths range from 13 to 20 fathoms.

Ward Isles, the north-westernmost of the Investigator group, are two in number; the western and larger isle, in lat. 33° 44′ 30″ S., long. 134° 17′ E., and W. by N. 8½ miles from the south-west point of Flinders island, is half a mile long, N.W. and S.E., and 162 feet high. The smaller isle lies 1½ miles to the south-eastward of the former, and both have reefs extending one and 2 miles westward from them, which should be carefully avoided by passing vessels.

There is a passage between Flinders and Ward isles, with soundings of 16 to 24 fathoms at 2 miles eastward of the latter isles; but this passage can only be used during daylight.

PEARSON ISLES, the south-westernmost of the Investigator group, form a chain extending 11 to 16 miles southward from the western Ward isle. The northernmost of the Pearson isles is about one mile long, North and South, and rises to two remarkable peaks, one of which is 781 feet high, and visible at the distance of 30 miles. There is a small indentation on the east side of the island; but from the great depth of water, no anchorage could be obtained at a reasonable distance from the shore.

The other five isles of this chain are, like the northernmost isle, of abrupt formation, with steep rocky shores and no outlying dangers. Soundings in 50 fathoms are found at 2 miles to the eastward and round by south to West of the southernmost of these isles, which is 460 feet high.

The COAST from cape Finnis trends eastward nearly a mile, and from thence it takes a S.E. ¼ E. direction 25 miles to the northern point of a bay, 13½ miles wide, North and South, and 2 miles deep, of which Drummond point forms the south horn. This rocky and barren coast, forming alternate bights and small cliffy heads, is of moderate elevation, and has Tungketta hill rising to 417 feet in height at 14 miles from cape Finnis, and mount Misery 374 feet high at 12 miles from Drummond point, on the range which skirts the shore.

Lake Hamilton, 8 miles long North and South, lies close behind the shore between mount Misery and Drummond point.

There is no anchorage between Waterloo bay and Coffin bay, a distance of nearly 55 miles.

Waterloo Bay is situated about 2¼ miles S.E. of cape Finnis, and is an indentation about three-quarters of a mile deep, and nearly the same across; the entrance is rocky, and the sea generally breaks across it. Near the centre of the bay there are 20 to 34 feet, rocky bottom, and in the middle of the channel leading into it, there is a depth of 18 feet at 2 cables from the rocky islet, off the eastern entrance point. This bay being quite open to the S.W., a heavy sea must set into the anchorage during a gale. There is no township, but a large quantity of wool from the neighbouring sheep stations is exported. There is a jetty here, 348 feet in length, having at its outer end at low water, a depth of 6 feet.*

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* *See* plan of Waterloo bay, on Admiralty chart, No. 1,061; scale, $m = 2 \cdot 5$ of an inch.

Cap Island, 93 feet high, lies 13 miles N.N.W. ¾ W. from Drummond point; the sea breaks at a little distance off its south side; but towards the mainland there is a clear passage 4 miles wide, with 20 to 27 fathoms water. There are 30 fathoms water at 2 miles to the southward and south-westward of the islet.

DRUMMOND POINT, S.E. ½ S. 40 miles from the eastern Waldegrave isle, is a prominent cliffy head projecting from the line of coast, and has a small dry rock and some breakers close to its extremity, with 27 fathoms water on a sandy bottom, at 1½ miles off it.

From Drummond point the coast trends S.E. by S. about 2 miles, having 10 fathoms on a rocky bottom at one mile off it, to a point with a rock awash at nearly one mile South of it. Thence the coast falls back to the north-east for a mile forming a bight, from the head of which it trends S.S.E. 12½ miles to the foot of mount Greenly, at the north-east extreme of Coffin bay. This coast is sandy, and rises gradually to some woody ranges at about 3 miles from the shore, and which terminate abruptly at about 2 miles to the southward of mount Greenly.

Rocky islet, 50 feet high, lies S. by E. 6 miles from Drummond point, and 3½ miles from the mainland to the eastward.

KRAUSE ROCK, with 8 fathoms on it, and 18 to 21 fathoms close around, lies S.W. by W. ¼ W., 8½ miles from Drummond point, and W. by N. 8½ miles from Rocky island.

SIR ISAAC POINT, the western point of Coffin bay, and the north extreme of Horse peninsula, is S. ½ W. 17 miles from Drummond point. The western part of Sir Isaac point is cliffy, with hills above, partially covered by vegetation, rising to a height of 170 feet. The eastern part of the point is lower, with a sandy beach at its base. There are 10 fathoms water within half a mile of the point, except to the eastward and south-east.

COFFIN BAY* extends nearly 8 miles to the eastward of Sir Isaac point, and is nearly 6 miles deep in a southerly direction.

There is deep water in parts of it, but in so exposed a position that anchorage cannot be recommended there; anchorage can only be obtained in this bay by small vessels, in 2 to 3 fathoms.

From the east extreme of Sir Isaac point the coast trends South for 4 miles, and is generally low, with rocky points and sandy beaches. Thence E. ¾ S. for 7 miles to Longnose point, being all a sandy beach, only projecting slightly in places. At 2 miles from the south-west corner of the bay there are some conspicuous bare sand-hills close to the beach, the highest of which is 150 feet. Longnose point is a narrow sandy peninsula 2 miles long, and nowhere more than 20 feet high.

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* *See* plan of Coffin bay, on Admiralty chart, cape Catastrophe to Nuyts archipelago, No. 1,061.

The eastern shore of Coffin bay may be said to commence under a hill called Frenchman's Lookout, from whence it trends South for one mile, and then curves slightly inwards 5 miles S.S.E. ¼ E., to where the cliffs end to the southward. As far as this the nature of the shore is rugged cliff, with wooded hills rising to various heights behind. At the south end of the cliff the coast changes to a sandy beach, with a wooded bank at the back, and alters its direction to S.W. by S. for 1¾ miles, to a low point 1¼ miles East from Longnose point.

Aspect.—There are some remarkable hills inland from the eastern shore of Coffin bay. The northern one is mount Greenly, which is 1,001 feet high, and N.E. ¾ E. 9½ miles from Sir Isaac point. Viewed from the northward or southward this hill is a sharp peak; from an easterly or westerly direction it has rather a long summit, falling suddenly to the northward, and sloping down gradually with three drops to the southward. A line of rocky cliff runs along the top of the hill on the seaward side and round the summit; from the base of the cliff the hill's wooded sides slope down to the summit of the coast cliff. To the southward the next hill is Frenchman's Lookout, which has three wooded summits of nearly equal height, all about half a mile from the coast. The highest and centre summit is 546 feet high, and S. ¼ E. 8¾ miles from mount Greenly. Cliff hill, 3¼ miles S.S.E. from Frenchman's Lookout, is very similar in appearance, having also three summits, the middle one of which is 586 feet high.

Mount Dutton is E. by S. ½ S., 11 miles from Sir Isaac point, 904 feet high, and about 1½ miles inland from the south end of the cliff on the east coast of Coffin bay. Its top is rather more than half a mile long, and curves from the highest part on the west side to the eastward and southward. This hill slopes down equally in all directions, and is well covered with shea oaks and other trees.

The Marble range, which runs in a North and South direction nearly 5 miles, is about 4½ miles East from Cliff hill, and has two remarkable rocky summits. The higher one, at the north end, is 1,421 feet high, and the other, near the south end of the range, 1,317 feet high, and very rocky near the top.

Soundings in Coffin Bay.—From Sir Isaac point the 3-fathoms line runs about half a mile offshore for 1½ miles to the southward, it then forms a bight about 2 miles deep in a south-easterly direction, and comes out again to a point where there are only 2¼ fathoms, S.E. by E. ½ E. 2½ miles from the eastern part of Sir Isaac point; there is only three-quarters of a fathom S.S.E. ¼ E. 1¼ miles from the 2¼ fathoms, and 14 to 15 fathoms will be found a quarter of a mile to the northward and eastward. From the point the 3-fathoms line trends S.E. for 2½ miles, and then curves round with the shore, continuing about 1¼ miles off as far as the south part of Cliff hill. To the northward of that, as far as Frenchman's Lookout, there are 4 to 5 fathoms water within half a mile of the shore, and then 10 fathoms at that distance on to mount Greenly.

Directions for the Anchorage.—Approaching Coffin bay from the southward, after Reef point bears southward of E.S.E., mount Greenly should be kept open to the left of Sir Isaac point N.E. by E. ½ E., to clear all the reefs and foul ground offshore between Reef point and Sir Isaac point.

The latter point may be rounded about half a mile off, and when that distance N.E. from its low eastern point, alter course to bring the conspicuous bare sand-hill in the south-west part of the bay a little on the port bow, and steer for its western extreme S. by E. ½ E. This course may be continued for 2 miles, or until a low sand-hill in the middle of a long sandy beach on the coast south from Sir Isaac point bears W.S.W. Then haul to the westward and anchor almost immediately in 2½ fathoms water, sand and mud, with the low sand-hill bearing W.S.W., and the eastern extreme of Sir Isaac point N.N.W. ¼ W.

In working towards this anchorage to keep in not less than 2¼ fathoms, when standing towards the shore south from Sir Isaac point, the eastern extreme of that point should not be brought to bear to the northward of N. by W. ¾ W., and in standing to the eastward the summit of the conspicuous bare sand-hill should not be brought to the westward of South.

PORT DOUGLAS, the entrance to which is over a bar in the south-east part of Coffin bay, is an extensive sheet of water, with an average depth of from 2 to 4 fathoms, but its northern part is much blocked up by sand-banks. From the entrance the port extends South 6 miles, and then East 4 miles, with a general breadth of 2 to 4 miles from shore to shore. Mount Dutton bay opens out on the north side of the eastern part of port Douglas; it is 4 miles long North and South, and 1½ miles broad, with a general depth of 2 to 3 fathoms. From the western side of the north part of Mount Dutton bay, a shallow bay extends nearly 3 miles farther to the northward.

A large sand-bank which dries in patches at low water extends off the coast of port Douglas west of Longnose point. The eastern edge of this bank is the right hand side of the channel into port Douglas from the entrance to 5 miles up.

The north point of the bank stretches well into Coffin bay, and is N.N.E. ¾ E., fully 2 miles from Longnose point, and one mile from the eastern shore of Coffin bay. The east point is E.S.E. 1½ miles, and the south point S. by W. 2½ miles from Longnose point, and only 4 cables from the western shore of port Douglas. Between the western edge of the bank and the coast near it, there is a deep pool which runs 2¼ miles to the north-west and northward, and is one mile wide in the middle, with depths from 3 to 5 fathoms all over it.

A bank, with less than one fathom on it, extends half a mile from the middle of the long sandy beach on the south-eastern side of the entrance to port Douglas, the north point of which bank is S. by E., nearly 4 cables from the north point of the sand-bank described above.

On the eastern side of the north part of port Douglas a large irregular dry bank stretches 2 miles from the shore, the western edge of which is the left hand side of the channel into port Douglas for 5 miles from the entrance.

The western point of this bank is E.N.E. half a mile from the southern point of the large western sand-bank; from there the edge of the bank recedes towards the eastern shore to the south-east, and the deep water part of the port increases to more than a mile in width as far as two small rock islets, which lie in the middle of the port and S. by E. ¾ E. 4½ miles from Longnose point. The western extreme of a bank connected with the eastern shore is E.N.E. 4 cables from the larger islet; and the eastern extreme of a spit, which has as much as one fathom water over the greater part of it, extending off the western shore in South nearly 4 cables from the same islet. There are 1¼ fathoms water East of this islet, 1½ fathoms South, and 2 fathoms West of it.

A spit extends South three-quarters of a mile from the shore which trends West from the West entrance point to Mount Dutton bay, and a bank nearly dries for about three-quarters of a mile from the whole of the southern shore of port Douglas, opposite the entrance of Mount Dutton bay.

The islet which lies in the extreme south-east part of port Douglas is 28 feet high, and surrounded by a dry bank which extends about half a mile East and West of it, and not more than 200 yards North and South.

Mount Dutton Bay.—The eastern shore of Mount Dutton bay is steep-to, and the western may be generally approached within half a mile. A dry bank extends 4 cables from the round headland at the northern part of the western shore, and the north-east side of the upper part of this bay is shallow. The deepest water in the north part of Mount Dutton bay is near the headland on the north side of the entrance into the shallow bay running North. A low rocky islet at the head of Mount Dutton bay has no more than 2 feet water inshore of it.

The country on all sides of Coffin bay is used for sheep stations, and a quantity of land West and S.W. of mount Dutton is about to be cultivated for wheat, but it is doubtful whether the rainfall is sufficient to make wheat-growing payable. The agricultural areas of lake Wangary and Wanow are studded with homesteads.

The mail road, running as far as Fowler bay from port Lincoln, passes within a mile of the north part of Mount Dutton bay, and a track from the road comes down to the shore of the bay, where there is a jetty 270 feet long, having at its outer end 4 feet at low water, from which cargo is usually shipped.

Killidie Bay.—At the extreme eastern end of port Douglas a narrow channel connects it with Killidie bay, which is 3 miles long East and West, one mile broad, and very shallow. This bay is noted for the quality and abundance of its oysters, but as the dredging has been carried on all the year round, regardless of season, for some 15 years, the mollusc was getting scarce. An Act, however, has been passed proclaiming a close season for oysters all over the coasts of the colony.

There is a rocky bar at the entrance of Killidie bay nearly awash at low water. The depth of water is as much as 2½ fathoms in some parts of the bay, but it is so much occupied by sand and mud-banks, that local knowledge is necessary for its navigation even by very small vessels.

Directions for Port Douglas and Mount Dutton Bay.—Port Douglas is only available for vessels drawing 10 feet, as there is a depth of only 8 feet on the bar at low water, and on many days the rise of tide does not exceed 3 feet. If drawing more than 8 feet a vessel should anchor in Coffin bay and ascertain the time of high water before entering port Douglas; and on going in, the wind should be in such a direction as to allow a vessel to lie two points either east or west of South. Having rounded Sir Isaac point, or from the anchorage in Coffin bay, bring mount Dutton to bear E. by S. ¾ S., and steer for it until the summit of mount Greenly is open to the right of all the summits of Frenchman's Lookout, bearing N. ½ W.; the vessel will then be less than three-quarters of a mile from the eastern shore, and should alter course to S. ½ E., keeping mount Greenly open to the right of Frenchman's Lookout until mount Dutton is in line with the junction of the sandy beach and cliff on the eastern shore, bearing E. by N. ½ N. Then haul quickly to the westward, until mount Greenly is between the two summits seen of Frenchman's Lookout, bearing N. ¼ W. This mark leads midway between the two banks at the entrance to port Douglas, and should be kept on until the low south extreme of Longnose point bears W.S.W. The direction of the fair-way of the channel is then S.S.E. for one mile, and then S.W. by W. ½ W. for 1½ miles, or until mount Greenly is just over the extreme of Longnose point. No leading marks can be given for the last two courses of the main channel; the channel is from 2 to 4 cables in width, and the edges of the banks on either side tolerably steep, and can generally be made out from aloft or, when mount Greenly is over the extreme of Longnose point bearing N. ¼ E., steer S. ¼ W., and keep the above leading mark on until within half a mile of the western shore.

The banks at the entrance to port Douglas will then be cleared, and course may be altered to S.E., to pass close to the south side of the rocky islets in the middle of the port.

The ebb tide runs very swiftly over the east point of the bank on the right hand side of the channel, and a good berth should be given it in consequence if entering on the ebb. If the wind will not allow a vessel to steer S.W. by W. ½ W., she can anchor in the first bend of the channel, and wait a convenient opportunity.

From near the rocky islets steer S.E. by E. for 2 miles, or for a rocky point in the middle of the long sandy beach at the south-east part of port Douglas. A vessel will then be at the best anchorage in the port in 2¼ fathoms water, sand and mud, with the western entrance point of Mount Dutton bay bearing N.E. ½ N., and the small islet in the south-east part of port Douglas bearing East; or, if wishing to go up Mount Dutton bay, may steer for the entrance about N.E., and keep rather on the eastern side in going up the bay. To clear the spit in the north part of the bay, running off the western shore, mount Dutton should be kept a little to the eastward of the rocky islet in the north part of the bay N. by W. ¼ W., until the junction of the sand and cliff on the east side of the bay bears East, then steer N.W. until mount Dutton is just open to the westward of the rocky islet bearing N. ¾ W., and anchor in 1½ to 2 fathoms water, mud.

A stranger not driven into Coffin bay by stress of weather, should prefer port Lincoln, in Spencer gulf, about 40 miles to the south-eastward of Sir Isaac point, for procuring any of the supplies this part of the coast affords, as it is in every respect a more desirable anchorage, and affords perfect shelter from all winds.

TIDES.—It is high water, full and change, on the bar of Coffin bay at 0h. 45m.; springs rise 6 feet; at the entrance to port Douglas at 0h. 55m.; springs rise barely 5 feet.

At the bar the flood and ebb streams make an hour after low and high waters respectively. The stream runs in the direction of the channel at the entrance to port Douglas, where the fairway is North and South, but across that part trending nearly East and West inside the entrance. The ebb stream, after a continuance of westerly winds, is so strong at the entrance that a vessel should not attempt to enter while it is running except with a fresh fair wind.

Reef Point.—From the northwest part of Sir Isaac point a rugged cliffy coast, with rocks and sandy beaches beneath, and sand-hills above, which in some places are covered with bushes, trends S.W. by S. 5½ miles to Reef point, the most projecting part of the coast between Sir Isaac point and Whidbey point.

A covered rocky reef, on which the sea breaks heavily, and extending N.N.E. and S.S.W. 1½ miles, lies off Reef point, from which point the north extreme of the reef bears N.N.W. ¼ W. 1½ miles, and the south extreme W. by S. ½ S. one mile.

Rocky ground, with 6 to 8 fathoms water on it, and over which the sea breaks in westerly gales, extends as far as 2½ miles N.N.W. from Reef point. To avoid this and all the foul ground between Reef and Sir Isaac points, a leading mark is given (page 81) in the directions for Coffin bay.

WHIDBEY POINT, the western part of which is S. by W. ¼ W. 5½ miles from Reef point, is fronted by low cliffs, and extends nearly 2 miles East and West. There is a round hill one mile back from the point, 181 feet high. The coast between Whidbey point and Reef point is of the same nature as that north of the latter.

A reef, on which the sea generally breaks, runs off the middle and eastern parts of this point for nearly three-quarters of a mile.

There are 20 fathoms water one mile from Whidbey point, and 10 to 13 fathoms at that distance offshore between it and Reef point; that part of the coast, however, should not be approached nearer than 2 miles, because of the heavy westerly swell that rolls in.

Greenly Island is a bold mass of granite, apparently inaccessible, with a peaked summit 755 feet high, W. by S. ½ S. 15¾ miles from the western part of Whidbey point. The island is about 1½ miles long W.N.W. and E.S.E. and half a mile wide at its broadest part; it is nearly divided into two islands at its north-west part, the sea sometimes running through the division. A small rock about 200 feet high, lies E. by N. ½ N. half a mile from the summit of Greenly island.

There are 50 to 53 fathoms water one mile to the westward of Greenly island, 46 to 40 fathoms from it to 5 miles from Whidbey point, towards which the depth gradually decreases to 20 fathoms, and between 40 and 50 fathoms from Greenly island to within one mile of the Four Hummocks of the Whidbey islands.

ROCKY or BEAGLE ISLAND lies S. by W. 10½ miles from Greenly island; it is a precipitous granite rock, 222 feet high, and one mile in circumference.

A covered rock, which always breaks, lies W. ½ N. half a mile from the north point of the island, and rocks extends 2 cables from its southern part; elsewhere the shore of the island appears to be steep-to. There are 45 to 53 fathoms water at the distance of rather more than a mile from Rocky island all round.

WHIDBEY ISLANDS are to the southward of Avoid bay, and consist of the Four Hummocks, a rock to the eastward of them, Perforated island, and two islands near Avoid point.

Four Hummocks are four steep rounded granite islands, with several small rocks amongst them, most of which are uncovered. The southern hummock is S. by W. ½ W. 12½ miles from Whidbey point, and E. by N. 15½ miles from Rocky island. It is 362 feet high, the most elevated of the Four Hummocks, and rather more than a mile in circumference. A large rock lies close to its south-east side. The passage between the southern and the two middle hummocks is 3 cables wide, and quite filled up with rocks, one of which is about 50 feet high.

The two middle hummocks are nearly joined, and on most bearings appear as one island with two summits.

Their joint extent is half a mile North and South, and about 400 yards East and West.

The northern of these two hummocks is the higher, its summit being 288 feet above water. There is a clear channel, 6 cables wide, and with 15 to 26 fathoms water in it, between the two middle and northern hummocks.

The northern hummock is N. by E. ¼ E. nearly 2 miles from the southern, half a mile long, N.N.E. and S.S.W., a quarter of a mile broad, and 293 feet high. E. by N. 2 miles from this hummock is a bare rock, 75 feet high, and about half a mile in circumference, with 21 to 27 fathoms water between it and the Four Hummocks, within a mile of all of which there are 27 to 45 fathoms.

PERFORATED ISLAND was so named by Captain Flinders, because it has a hole through it, nearly at the top of the island, about a quarter of a mile from its north point. The centre of Perforated island is S. by E. ¾ E. 8½ miles from Whidbey point, and it is nearly midway between the Four Hummocks and Avoid point.

The island is of a very irregular shape; the heavy sea, which breaks on it, having washed the limestone, of which it is composed, into wild and rugged forms. It is 1½ miles long N.N.E. and S.S.W. from 600 yards to 50 yards wide, and surrounded by steep cliffs nearly as high as the top of the island, which is 235 feet above water.

The sea breaks heavily on a sunken reef, which extends W. by S. nearly a mile from the south point of the island; and there is so much foul ground between E. by S. round by south to W.S.W. to the distance of 3 miles from its south point, that the island should not be approached nearer than 4 miles on any bearing to the northward of East or West. With the island bearing to the southward of East or West it is safe to approach to one mile.

The depth of water between it and the outer island of the two off Avoid point is 13 to 23 fathoms, and there is 20 to 25 fathoms between it and Whidbey point.

The outer of the two islands near Avoid point bears S.W. ¼ W. 2½ miles from that point, and is 5¾ miles distant from Perforated island. It is 209 feet high, about 1½ miles in circumference, and surrounded by limestone cliff. This island is steep-to, with the exception of a reef running N.N.W. 2 cables from its north point. The island nearer to Avoid point lies S.S.E. three-quarters of a mile from the south part of that point. The island and point are connected by a rocky ledge, the greater part of which is covered. This island is of limestone formation, 181 feet high, more than half a mile long, E.N.E. and W.S.W., and about 200 yards broad. A sunken reef extends W. by S. one mile from the west point of the island.

Currents.—Between Greenly island, Rocky island, and Whidbey islands the currents are very strong, causing in many places about those islands a confused sea during and after a gale.

Amongst the outer islands in the summer months, from November to May, the current runs to the N.W. as much as 2 knots an hour, after a continuance of south-easterly winds. In the winter, with westerly winds, it runs quite as rapidly to the eastward.

AVOID BAY is 11 miles across from Whidbey point to Avoid point, and 4 miles in depth. The soundings average 10 fathoms one mile from any part of the shore of the bay, and from 18 to 24 fathoms in the middle. From the east part of Whitbey point to a point N.E. by E. 4 miles from it the coast forms a bay, with low rocky cliffs, and here and there a sandy beach. In some places covered rocks extend nearly half a mile from this part of the coast. A small rocky islet lies a quarter of a mile S. by E. from the latter point; its sides rise quite smoothly from the water towards the centre, which springs up abruptly from the surrounding rock in the shape of a small dome, the summit of which is about 75 feet above the sea. The northern part of the last-mentioned point runs back about half a mile to the north-west; and from there a sandy beach, with bare sand-hills behind rising to a height of 216 feet, curves to the eastward for nearly 3 miles. The coast then becomes cliffy, with green and wooded hills inland, one of which is 254 feet high, for 3½ miles to the south-east, as far as a projecting point inside the Black rocks. Thence a sandy beach, with some bare and some wooded sand-hills behind, runs nearly 5 miles south-east, to the beginning of the cliffs of Avoid point. This beach is broken in the middle by two or three dark rocks which extend a short distance into the water.

Black Rocks are in the middle of Avoid bay, three quarters of a mile from the projecting point mentioned above.

The largest and highest is 154 feet high, and about three-quarters of a mile in circumference. A reef, on which the sea breaks, extends S.E. 7 cables from the south point of this island, with a small rock above water at the south-east extreme of the reef. A flat rock lies one cable W.N.W. from the large island, and a reef extends 3 cables farther in that direction, with another small rock at its north-west extreme.

There are 5 to 9 fathoms water between the Black rocks and the shore, and 15 fathoms within a mile to seaward of them.

AVOID POINT is S.E. by E. ¾ E. 11 miles from Whidbey point, and has a green hill above it 188 feet high. It is surrounded by limestone cliffs, about 150 feet high, on its north, west, and south-west sides, which changes abruptly to sand-hills to the eastward of its south point. A rock on which the sea seldom breaks lies 3 cables N.E. from a rocky point which has a sand-hill above it, on the north part of Avoid point. There is a flat rock above water close to the west part of Avoid point; and a sunken rock, which nearly always breaks, lies W. ¼ N. one mile from the flat rock; with 9 to 11 fathoms water between, and 20 to 23 fathoms half a mile to the westward of the covered rock.

Clearing Mark.—To avoid the sunken rock, when standing into Avoid bay, the western extreme of the outer island near Avoid point should not be brought to bear westward of South, until the north point of Avoid point bears southward of East.

STUART POINT is S.E. by E. ¼ E. 10¼ miles from Avoid point. The summit of Stuart point is a round green hill, about 450 feet high, and the cliff face of the point about 400 feet from the sea to the top of the cliff.

The COAST.—From the south part of Avoid point a sandy beach trends N.E. 1¼ miles, and then runs in almost a straight line 8 miles S.E. by E. to where the cliffs begin, nearly 2 miles from Stuart point. There is always a heavy surf on the beach between Avoid and Stuart points, and not less than 13 fathoms within a mile of the coast.

Aspect.—Directly inland from Avoid point the hills are wooded, and about 200 feet high; at the back of the long sandy beach they are nearly bare sand, and extend inland 5 miles from the eastern part of the beach; about 2 miles behind which they attain their greatest height, 540 feet North 2½ miles from Stuart point is the summit of a wooded hill, which slopes down to the cliff north-west of Stuart point, and joins on to the sand-hills to the northward. This hill is 750 feet high, and the most elevated land between Whidbey point and cape Catastrophe.

Stuart Reef.—A dangerous reef, which is always covered, and only breaks heavily when there is much swell, lies S. by E. ¾ E. 8¼ miles from Avoid point, and S.W. by W. ¾ W. 6¾ miles from Stuart point. The reef is about 800 yards long W.N.W. and E.S.E., and very narrow. There are 22 to 23 fathoms water close to it, and nearly all the way from it to the shore; and 30 to 34 fathoms, 2 miles to the southward of East or West from it.

The COAST from Stuart point extends S.E. 10 miles, with no considerable indentation.

It is all very rugged limestone cliff, about 400 feet high, rising in many places perpendicularly from the sea to its summit; the hills above the cliff are from 50 to 100 feet higher than it, most of them being covered with coarse grass, with here and there bare sandy patches. Close under a green hill, 470 feet high and 6½ miles from Stuart point, is a remarkable cone of rock about 350 feet high, and almost detached from the adjacent cliff. It can only be seen when near the shore to the N.W. or S.E. of it.

There are 14 to 20 fathoms water within a mile of this part of the coast, and deep water to seaward, with the following exceptions:—

A Rock which is covered, and which seldom breaks with S.E. winds, lies half a mile off shore, 4 miles S.E. of Stuart point.

Cape Reef, 21 feet above water, and extending a quarter of a mile North and South, lies S. by E. ½ E. 8 miles from Stuart point, and W. by N. ¾ N. 4½ miles from the west point of cape Wiles. There are 40 fathoms water at less than a mile westward of this reef, and 21 to 27 fathoms the same distance from it elsewhere. A small sunken rock, which breaks with a moderate swell, lies N.N.E. ½ E. 2 miles from the north point of the above reef, and nearly 2 miles S.W. by S. from the Cone rock. There are 20 fathoms water midway between this rock and the shore, and 23 to 26 fathoms between it and the reef.

CAPE WILES is a broad point, its southern face extending more than 3 miles East and West. Its west point is S.E. by S. 11½ miles from Stuart point; from there it bights back to the northward for 2 miles, and joins the straight coast from the east point. The summit of the west part of the cape is a round stony hill 292 feet high, which slopes down to the shore. Low cliffs commence from the south point of the west part of the cape, and rise gradually, attaining their greatest elevation at the east point of cape Wiles, where the scrub-covered summit, 468 feet high, shows just above.

A rock, on which the sea breaks, lies N.W. ½ W. 7 cables from the extreme west point of cape Wiles. And a reef above water extends 3 cables South from the part of the cape due North of Liguanea island.

There are two high rocks just detached from the east point of cape Wiles, which are conspicuous from Sleaford bay or the westward. A rock above water, 400 yards in extent East and West, lies 3 cables South from the east point of the cape.

There are 18 to 29 fathoms water between cape Wiles and Liguanea island, and deep water within half a mile of all the rocks and reefs mentioned above.

LIGUANEA ISLAND is 1½ miles long North and South; and half a mile broad, except at its south part, where it is narrow and irregularly shaped.

All the coast of the island is cliffy, and its top is rather flat; the highest, part, at the south end, is 127 feet above the sea.

Its north point is S. by E. 2 miles from the west point of cape Wiles The south extreme of a detached reef above water bears S. by W. ½ W., half a mile from the south point of the island.

There are 45 fathoms water at one mile South of Liguanea island, and between 30 and 40 fathoms that distance eastward or westward of it.

SLEAFORD BAY extends 9 miles eastward of cape Wiles, and is 5 miles deep in a northerly direction. There are 10 to 20 fathoms water within a mile of the shore all round the bay. No anchorage can be recommended in any part of it, as a heavy swell always sets in, and during bad weather the sea is very confused.

Fishery Bay.—From the east point of cape Wiles a high dark limestone cliff trends North 2 miles to Fishery bay. This bay is about half a mile across at its entrance, and runs in a half a mile to the N.W., the shore being cliffy on either side, with a sandy beach occupying all the head of the bay.

An establishment for whale fishing, consisting of whale boats and means for "trying out," was carried on in this bay in the early days of the colony. It has been long abandoned, the whales having become scarce on this part of the coast, although it is now occasionally visited by whalers from Tasmania.

Water.—There is good water behind the middle of the beach, amongst the low sand-hills; and although the bay cannot be recommended as an anchorage, a boat may easily land on the beach in moderate weather.

The COAST.—From the north point of Fishery bay to a point N.E. by E. three-quarters of a mile from it, the coast forms a bay with cliffy coast, and a sandy beach in its north part. A breaking rock E. by N. half a mile from the north point of Fishery bay, lies outside the line joining the two outer points of the bay. The coast, which is rocky and sloping up to the top of a round green hill, about 300 feet high, and with two clumps of trees on its eastern side, then trends N. by E. for 2½ miles. From the north-west part of Sleaford bay the shore runs East and E. by S.

for 8 miles; for 5 miles it consists of small sandy beaches, broken by bits of dark limestone cliff, with green wooded hills at the back rising to a height of about 250 feet. The remaining 3 miles is a sandy beach, with high bare sand-hills behind, stretching a mile inland, where they join some wooded hills, the highest of which is 280 feet above the sea. A quarter of a mile off the east end of the long sandy beach is a small rocky islet about 25 feet high. From there the coast rises in high cliffs, and curves to the southward for 2¼ miles to the east point of Sleaford bay, which has a green hill 340 feet high for its summit, with no trees on it, and is E. by N. 8¼ miles from cape Wiles. Three-quarters of a mile S.E. by S. from the rocky islet mentioned above is another rocky islet, about 2 cables from the nearest cliff, and 180 feet high.

Cobbler Hill is a conspicuous landmark from the north-west part of Sleaford bay. It is N. ¼ E. 11¾ miles from the east point of cape Wiles, conical in form, 640 feet high, and standing alone. North-side hill, described in the directions for port Lincoln, is also remarkable from the west part of Sleaford bay.

Sleaford Mere is a sheet of brackish water on the mainland, nearly 4 miles long, North and South; and one mile to half a mile wide; it is divided near its centre into two branches, one trending southward and the other south-eastward, and both terminating within 100 yards of the head of Sleaford bay. The northern extreme of this lagoon extends to about 2 miles south-westward of some fresh-water pits, at the head of port Lincoln, to the northward.

The COAST from the east point of Sleaford bay trends E.S.E. 4 miles, and then S.S.E. 4 miles to West point of cape Catastrophe. The east point of Sleaford bay runs back three-quarters of a mile N.N.E., the cliff on that side being nearly 300 feet high; there are then three small sandy beaches with rocky points between, and sand-hills behind. From off the middle beach a chain of low rocks and islets extends 2 miles South; the highest of these islets is about 120 feet above water, and the south point of the outer rock, which is all large smooth boulders, is S.S.E. 1¾ miles from the east point of Sleaford bay. There are about 30 fathoms water at one mile from this rock to the southward of East or West from it.

Eastward of the third beach the coast-line becomes bolder, the cliffs rising 400 feet above the sea under a wooded hill 640 feet high, about 2 miles farther on. The shore is bold and rocky the remainder of the distance to West point, the soundings being from 20 to 38 fathoms one mile off shore.*

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* *See* Admiralty chart of Australia, South coast, St. Vincent and Spencer gulfs. No. 2,389 a; scale, $m = 0{\cdot}13$ of an inch.

WEST POINT.—The south-west extremity of cape Catastrophe, a cliffy headland, in lat. 35° 0′ 30″ S., long. 135° 56′ 30″ E., rising to a smooth conical hill 460 feet high, and clothed with vegetation.

WILLIAMS ISLE, the north-west extreme of which lies S.S.E. one mile from West point, is about 3 miles in circuit, its south side being very rugged, with long ledges of rock running out from the cliffs; there is a bay on the north side with a small sandy beach at its head. The summit of the island, which is nearly flat, is covered with stunted bushes about 2 feet high, and is much burrowed by mutton-birds, and in the winter months is frequented by cape Barren geese.

The passage between Williams isle and the mainland is quite clear, with 27 fathoms in mid-channel; but a heavy sea and race extend across the passage. At 2 cables length from the west side of the island there are 20 fathoms water, and 50 fathoms within 1½ miles to the S.W. of it; but on its parallel farther to the westward the depth is not so great, 40 fathoms, on a regular sandy bottom, being found at the distance of 2 to 16 miles in that direction.

CHAPTER II.

AUSTRALIA.—SOUTH COAST, SPENCER GULF.

Variation in 1884.

Gambier islands	4° 5′ E.	Port Augusta	4° 50′ E.

SPENCER GULF,* the greatest inlet on the south coast of Australia, is 48 miles across at the entrance from cape Catastrophe E. by S. ¾ S. to cape Spencer, and from the entrance extends in nearly a N.N.E. direction 180 miles to port Augusta, at the head of the gulf, with navigable water for vessels of the greatest burden. Although the entrance is 48 miles wide, this space is partly occupied by Thistle island, near the western shore, and the Gambier group, midway between that island and cape Spencer ; besides these, there lie in the offing to the south-westward, the Low rocks and the straggling Neptune isles.

Neptune Isles are three in number, with several rocks, above and under water, the south-easternmost isle being in lat. 35° 20′ 15″ S., long. 136° 6′ 45″ E. This isle, which is barely 2 miles in circumference, seems entirely composed of black-looking granite; it is 120 feet high, with a little stunted vegetation. The sea breaks so heavily on the south sides of these islands, that from a distance of 2 or 3 miles the spray has been seen flying 40 or 50 feet over the top of the south-easternmost isle.

The next Neptune isle, which lies about N.N.W. half a mile from that just described, is more than 2 miles in circuit, and 115 feet high, with its greatest extent North and South ; and, like the other isles, this also appears to be composed of black-looking granite. The passage between the two south-eastern of Neptune isles is about one quarter of a mile wide, but it has two or three large rocks in it.

The north-westernmost isle, the largest of the Neptune group, and which lies N.N.W. ½ W. 5 miles from the south-easternmost isle, is 3 miles in circuit, and 160 feet high. It is nearly flat-topped, its south and south-west sides forming granite cliffs, against which the sea rolls in very heavily. At a quarter of a mile eastward of the south point of the island is a rock on which the sea only breaks at times, but then with great violence. There is a bay on the east side of the island with a small sandy beach, on which there was a heavy surf.

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* *See* Admiralty charts of Australia, South coast, St. Vincent and Spencer gulfs, Nos. 2,989 a and b ; scale, $m = 0\cdot13$ of an inch ; Australia general chart, southern portion, No. 2,759 b ; scale, $d = 1\cdot0$ of an inch ; and chart of South Australia, cape Catastrophe to Nuyts archipelago, No. 1,061 ; scale, $m = 0\cdot3$ of an inch.

An islet lies about a quarter of a mile to the eastward of the north-east point of the north-westernmost Neptune isle, consisting of a mass of granite half a mile long, East and West, 200 yards broad, and 95 feet high. At half a mile off the east end of the islet there is a heavy breaker more than 200 yards across.

There are 40 to 50 fathoms between the south-eastward and north-westernmost Neptune isles, and 56 fathoms, sand, at 2 or 3 miles to the southward of them.

LOW ROCKS, nearly North 3½ miles from the north-westernmost Neptune isle, are a straggling mass about 600 yards long, East and West, 50 yards broad, and 30 feet high. At N.E. by N. 4 cables from them is a small rock awash, with a heavy break upon it. There are 42 fathoms between the north-westernmost isle and Low rocks, and 44 fathoms in the channel between Low rocks and Thistle island.

Caution.—As Neptune isles are rocky and surrounded by breakers, and Low rocks have little elevation, they should be carefully avoided at night.

GAMBIER ISLES, N.E. by E. 19 miles from the south-easternmost Neptune isle, consists of Wedge isle and four small islets near it.

Wedge Isle is situated nearly midway between cape Spencer and Thistle island; its summit being visible at the distance of 30 miles, may be seen by nearly every vessel passing into or out of Spencer gulf. This island is 3 miles long, E.S.E, and W.N.W. with an average breadth of one mile; three of its sides consist of cliffs. West rock (awash), on which the sea always breaks, lies W. by S. ½ S. 4 cables from the north-west point; and a reef with some sunken rocks, extending more than a quarter of a mile from a low projection of the island, at one mile to the south-eastward of the point. From the south-east extreme the island rises gradually to the height of 662 feet, forming nearly a perpendicular cliff to the southward, which gives the island a wedge-like appearance from a distance.

Wedge isle, which is principally formed of limestone, is mostly covered with low bushes and casuarina trees, with a little grass, and has for some years been used as a sheep-run. At present it is uninhabited.

Water.—There was a good stone house and several wells of good water in the low land within the beach, to the south-eastward of the house, and another well by the sand-hills near the north-west point.

Anchorage.—There is a sandy beach on the north-eastern side of Wedge isle, off which there is good anchorage in 5 or 6 fathoms water, sheltered from N.W. and round westward to S.E., at about a quarter of a mile from the shore, with the house or east corner of the field on the island bearing South, and the north-west point N.W.; landing on the beach is generally easy.

Peaked Rocks are two conical islets, one S.W. half a mile, and the other S.E. a quarter of a mile from the south-east point of Wedge isle. The outer rock is 212 feet, and the inner one 141 feet high, and both are much frequented by seals.

South-west Rock, a mass of granite 70 feet high, bears W. ¾ S., distant 3½ miles from the south-east point, and 1½ miles from the nearest part of Wedge isle, with the west and north-west points of the island and the west extreme of North islet in line. This rock, which is about one mile in circumference, is divided into two unequal parts by a cleft running N.N.E. and S.S.W. There is a clear channel, with 27 fathoms, between South-west rock and Wedge isle.

Foul Ground.—A rocky patch, with 12 fathoms water on it, lies S.E. nearly 4 miles from Wedge isle, with 28 to 30 fathoms all round it; it is nearly circular, and about a quarter of a mile in diameter, with occasionally heavy breakers upon it, during and after west and south-west gales.

Clearing Marks.—When on the shoalest part of Foul ground, the west extreme of North islet will be just touching Wedge isle, bearing N.W. by N., and the south side of the highest Peaked rock will be in line with the south-west point of the island, bearing N.W. by W. In order, therefore, to pass well to the northward of the Foul ground, keep the outer Peaked rock well open south of Wedge isle, or North islet well open north of the island; and to pass to the westward keep North islet entirely shut in.

North Islet, the second in size of the Gambier group, lies 1½ miles to the northward of Wedge isle, and is three-quarters of a mile long, East and West, half a mile broad, and 155 feet high. Landing is easy on its north-west side in fine weather. It has stunted vegetation and a few casuarina trees on it; the whole islet is much burrowed by mutton-birds. There is a 9-fathoms channel between Wedge and North isles.

Ward Rock, which has 6 fathoms water over it, lies West three-quarters of a mile from North islet, and N. by W. ¼ W. one mile from the north-west point of Wedge isle. This rock is less than 200 yards in extent each way, and rises nearly abruptly from the depth of 20 fathoms. Ward rock is dangerous in a heavy swell, as it then breaks violently at times; in fine weather it does not show.

Clearing Marks.—In proceeding between Ward rock, and West rock at W. by S. ½ S. 4 cables from the north-west point of Wedge isle, both these rocks may be cleared by keeping the high cliff of the east point just open of the north-west point of Wedge island, bearing S.E. by E.

The north-west point of Wedge isle may be rounded close to; but after passing it, a good berth should be given to the reef and sunken rocks extending from the low point one mile south-eastward of the north-west point, after having cleared which, the vessel may come to in the anchorage off the sandy beach, as already directed.

Middle and N.N.E. Rocks, the only dangers of the Gambier group, to the northward of North islet, are both awash, and lie respectively North one mile, and N.N.E. nearly 3 miles from the islet; Middle rock being in line with the west extreme of North islet, the north-west and west points of Wedge isle and South-west rock. There are 17 fathoms between North islet and Middle rock, and 20 to 24 fathoms between the two rocks, which may be passed close to.

Clearing Marks.—To clear Middle and N.N.E. rocks to the westward, keep South-west rock its own breadth open of the west point of Wedge isle bearing S.S.W. The eastern Peaked rock kept clear of Wedge isle bearing S. ¼ W. will clear Middle and N.N.E. rocks to the eastward.

TIDES.—It is high water full and change, at the Gambier isles, at 2h.; springs rise about 5 feet. The flood stream sets to the N.W. and the ebb to the S.E., from less than half a knot to three-quarters of a knot.

THISTLE ISLAND, which is the largest island in the entrance of Spencer gulf, lies near the western shore, and forms part of the eastern side of Thorny passage, the south-east extremity of the island bearing about E. by S., distant 12¼ miles from the West point of cape Catastrophe. Thistle island is 9 miles long, N.W. and S.E., and, although only three quarters of a mile broad at the centre, it increases to 2 miles in breadth towards each end. The centre of the island rises to the height of 772 feet, and may be seen in clear weather at the distance of 35 miles.

Thistle island has from time to time been used as a sheep and cattle run, but has not been found hitherto to answer; owing, it is stated, to the cattle and sheep eating some poisonous grass or herb which grows on the island; otherwise it appears very fit for grazing purposes. In 1863 the island was deserted; but there was a good weather-board house, just within the beach North of Snug cove; in the garden were some wells of slightly brackish water.

Waterhouse Point, the narrow south-east extreme of Thistle island, is a rugged cliffy head 120 to 130 feet high, sloping gradually down to the northward on either side. An islet lies W.S.W. three-quarters of a mile from the point, at a quarter of a mile from the shore, with 6 fathoms between it and the point; but in a gale the water breaks right across.

Race.—Waterhouse point is fronted with high black rocks and very deep water, and as the tide streams sweep round the point at the rate of 2 knots, the flood to the northward and the ebb to the southward, the latter meeting the south-westerly swell, causes, with southerly winds, a dangerous race, which is felt as far as 2 miles off the point.

SOUTH ROCK, which lies S.W. 1½ miles from Waterhouse point, is about 100 yards in extent; it is just awash, and has always heavy breakers on it. There is deep water all round this rock, and there are 30 fathoms between it and the islet.

Directions.—Vessels rounding the south-east end of Thistle island should give it a berth of more than 2 miles, to avoid South rock and the race off Waterhouse point.

WATERHOUSE BAY, on the eastern side of Thistle island, at about one mile northward of Waterhouse point, affords shelter for coasters in 3 fathoms water, sand, at a cable from the beach, with the southern point of the bay bearing E.S.E. Care must be taken, when going in or out, to avoid a rocky patch extending 200 yards, East and West, which lies from the point N.W. nearly one-third of a mile, with its inner end at one cable from the beach. This patch only breaks at times, though part of it is nearly awash at low water.

Eastern Coast.—From Waterhouse bay to the south-eastern point of Whaler bay, about N.N.W. 3¼ miles from Waterhouse point, the eastern coast of Thistle island consists of sandy beaches and rocky points with ledges running out, but with no dangers beyond 2 cables from the shore. The soundings deepen rapidly to more than 20 fathoms at 1½ miles from this part of the coast.

WHALER BAY.—The south-eastern point of Whaler bay is rocky, with a limestone cliff, and points to the northward; on its western side the land recedes, and a fine sandy beach forms Whaler bay, which affords good anchorage, for coasters, in 4 fathoms water, sand, sheltered from West round southward to East, with the south-eastern point bearing E.N.E., distant a quarter of a mile.

Supplies.—There is good schnapper fishing within the south-eastern point of Whaler bay, and firewood may be cut in abundance.

North-eastern Coast.—At W. by N. about one mile from the south-east point of Whaler bay the high cliffs at the centre of Thistle island commence and continue 2 miles in a N.W. direction, after which alternate beaches and points extend to Observatory point, the north extremity of Thistle island, bearing N.W., distant 6 miles from the south-eastern point of Whaler bay.

OBSERVATORY POINT is a low projection of a long sandy beach, extending on one side S.E. one mile, and on the other S.W. an equal distance. From the north-west side of Observatory point a sand-flat extends three-quarters of a mile, studded with rocky patches, some not having more than 5 feet over them at low water. There are occasionally breakers on this flat with strong south or south-west winds.

Anchorage.—On the north-eastern side of Thistle island the soundings gradually shoal to the north-westward, and a vessel can get good anchorage in 7 fathoms on a sandy bottom, with Observatory point bearing W.N.W., distant three-quarters of a mile, and the south-east end of the beach S. by W. or South. Here the tide streams never set more than half a knot, the flood sometimes to the S.E. and the ebb to the N.W.

South-western Coast.—Between Waterhouse point and another point to the westward, abreast of the islet before noticed, the coast forms a deep bay, with two small sandy beaches at its head; the water shoals gradually as they are approached; but the bay does not afford good anchorage, as the south-westerly swell sets into it.

FOSSIL POINT.—From the western point of the bay just described the south-western coast of Thistle island takes a N.W. direction 2¾ miles to Fossil point, at a quarter of a mile to the south-eastward of which is a gully containing fossil trees of various sizes.

From Fossil point the coast trends North 1¼ miles, and then extends north-westward 3 miles, in nearly a direct line, to a sandy beach, and is formed of reddish limestone cliffs, 600 to 400 feet high. The cliffs, which are highest in the bight, fall gradually and assume a white appearance, being formed of white limestone nodules and sand on a granite base. Rocks, on which the sea occasionally breaks, extend half a mile southward from the beach.

The prevailing south-west winds have blown the sand from the beach nearly across the island to the north-eastward, forming a causeway of white sand, which, at the distance of three-quarters of a mile from the beach, has formed a sand-hill 268 feet high, over which the sand is driven, giving it a very remarkable appearance.

North-western Coast.—The coast from the sandy beach trends W. by S. one mile to a high white cliff, with a ledge of rocks, on which the sea breaks, extending 400 yards to the southward. Between this cliffy projection and a point lying N.N.W. one mile from it, the coast forms a bay, and from thence becomes rocky, with whitish limestone cliffs, gradually falling to the northward, and takes a N.E. direction for about a mile to the south-west point of Snug cove, a boat harbour between this point and the south-west extreme of the beach extending from Observatory point.

Tides.—It is high water full and change, in Snug cove, about 2h. 0m.; springs rise 5 feet; but the rise and time of high water seem to be influenced a great deal by the wind; strong westerly winds apparently producing the highest tides. The times of high and low water seem to be regular for the first week after full and change; after which there is only one tide in 24 hours for five or six days, with high water from 8h. p.m. to midnight, when the tides again become regular.

Hopkins Isle, known also as Snake isle, lies about three-quarters of mile off the white cliffs of the north-west extreme of Thistle island, to which its own shore bears a great resemblance. Hopkins isle is one mile long, N.E. and S.W., half a mile broad, and rather flat-topped, with perpendicular cliffs; it is 200 feet high, its sandy surface being burrowed all over by mutton birds.

The passage between Thistle and Hopkins islands is about half a mile wide, but it is blocked up with rocks and breakers, the rollers on the ebb frequently breaking right across. A few detached rocks lie nearly half a mile northward of the island, and abreast of the landing-place, which is on a small patch of sand.

This island is dangerous to approach from the southward, as the rocky shoal connecting it with Thistle island extends nearly three-quarters of a mile south westward towards Smith isle. There is a sunken rock on this shoal at S. by W. 4 cables from Hopkins isle, upon which the sea breaks heavily, except in fine weather, when it does not break at all on the rock.

BLACK ROCK, N. ¾ W., nearly 1⅓ miles from Observatory point, the north extreme of Thistle island, is awash at high water, but at low water appears as a mass of black granite, 6 feet above water, and 50 yards in circumference. Rocks under water extend from black rock for half a cable all round, and a ledge projects 2 cables to the northward, there are 4 fathoms water between the rock and Observatory point.

There is seldom much broken water on Black rock, and when coming from the southward late in the afternoon, it is not easily distinguished until within half a mile of it. From Black rock the cliffy extremes of Hopkins and Thistle islands appear a little open, bearing S.S.W., and the rocky projection S.E. of Observatory point is in line with the highest part of Thistle island, bearing about S.S.E. ¼ E.

Clearing Marks.—Hopkins isle kept well open of Thistle island clears Black rock to the westward, and the projection to the S.E. of Observatory point kept between the high cliffs and the south-east point of Whaler bay, leads between Black rock and the flat north-westward of Observatory point.

PORTER ROCK, N.N.E. ¼ E. 1¾ miles from Black rock, with the cliffs of Thistle and Hopkins islands just opening to the S.S.W., is a covered patch 400 yards long and 150 yards across, the least water on it being towards its northern end, where there are several knobs with only 3 feet on them at low water; towards the southern extreme there are 2 fathoms.

Caution.—This rock is very dangerous, as it lies in the direct track of vessels from the south-eastward proceeding to port Lincoln, with seldom sufficient breakers upon it to attract attention, and frequently there is no broken water upon it for some days.

From Black rock to Porter rock there are 6 fathoms, on a rocky bottom, and soundings in 7 fathoms extend N.W. one mile from Porter rock; with these exceptions there are 10 and 11 fathoms about it.

Clearing Marks.—Porter rock is cleared to the eastward by keeping Hopkins isle closed in by Thistle island; and to the westward by the same islands being kept well open of each other; the northernmost of the high-wooded conical hills north of Memory cove open to the northward of Taylor isle, bearing West, leads three-quarters of a mile northward of this rock.

CAPE CATASTROPHE.—The general aspect of the coast about this cape is high and rocky, with cliffs of reddish and white limestone 50 to 100 feet high, behind which the land rises to conical hills densely wooded with gum scrub to their summits. From West point, the southern extremity of cape Catastrophe, the coast trends N.E. by E. ¾ E. 3 miles to the south-east point of the cape, and forms two small exposed sandy bays, separated by some projecting cliffs of whitish and level aspect. Behind the shore the land rises to a rocky range of considerable elevation, upon which there are a few trees. The south-east extreme of cape Catastrophe is high and rocky, with a ledge of black rocks, on which the sea breaks heavily, extending about 100 yards from it.

Sunken Rock.—A small sunken rock, on which the sea was said to break only at times, was formerly supposed to lie E.N.E., 2½ miles from the north-east extremity of Williams isle, and S.E. ¾ S. nearly 2 miles from the south-east extremity of cape Catastrophe.

A good look-out, however, was kept for this rock by Commander Hutchinson on several occasions, when there was a heavy swell running, but nothing like a break was seen, except the tail of the race off cape

Catastrophe; nor were any signs of shoal water seen from the Colonial surveying vessel, *Beatrice*, when sailing in the vicinity, with a light wind and very heavy swell.

TIDES and RACE.—Strong tide-streams run close round cape Catastrophe, the ebb setting S.W. and the flood N.E., between it, and Williams isle, causing, with the wind on shore, a race which would be dangerous to a small vessel.

The COAST.—From the south-east point of cape Catastrophe the coast, consisting of high cliffs, mostly of granite formation, trends N. by W. ½ W. 1½ miles to the east point of Memory cove; this point, which is very low, may be rounded in 8 fathoms water at the distance of 20 yards.

Memory Cove is about half a mile across, East and West, and one-third of a mile deep, with a narrow sandy beach, one cable long in the bight. It is well sheltered from all winds from N.N.W. round by west to S.E.; but with north-east or north winds a short sea gets up, which washes the sand off the beach leaving the rocks underneath exposed.

The *Beatrice* used to anchor in 5 fathoms water, sand, with the east point of the cove in line with the north cliff of Hopkins isle bearing E. ½ N., and the east corner of the beach South; but a larger vessel might anchor farther out in 8 or 9 fathoms, with the point touching the north extreme of Smith isle bearing S.E. by E., and the east extreme of the beach S. by W.

Supplies.—Rock fish may be caught with hook and line off the east point of Memory cove, and firewood may be obtained in abundance; but no fresh water could be procured, except a few bucketfuls, after heavy rains.

The COAST.—From Memory cove the coast trends North 2½ miles to a point having a detached rock off it; and from thence N.N.W. 5 miles to a long sandy beach, with low land behind it. Nearly the whole of this coast consists of limestone cliffs, forming several small coves; one of which, with 5 fathoms water, lies close to the westward of the point just noticed, and Shag cove, with 3 fathoms water, N.N.W. 1¾ miles from it. Coasters might lie in these little bights out of the influence of the tide-streams, and sheltered from all westerly winds. The land at the back of the cliffs, and the hills also, are thickly covered with scrub.

The long sandy beach just mentioned trends N.E. 2 miles to a rocky point, from whence the coast takes a N.N.E. direction for 2 miles to Maclaren point, which projects half a mile from the line of coast, and has a bight on either side of it. A rock with one fathom on it, lies N.E. by N. 1½ cables from the pitch of Maclaren point, and another rock, about 10 feet high and 100 yards long North and South, lies N. ¼ E. 1¼ miles from the same point, and 4 cables off shore; there are 6 fathoms water close to this rock to seaward, and one to 2½ fathoms between it and the shore.

There is a good schnapper ground in 5 or 6 fathoms water off Maclaren point.

From the inner part of Maclaren point the coast trends North for 2½ miles, forming a bay; it then curves round 2½ miles N.W. by N. to cape Donnington, being composed of sandy beaches and low rocky points, with scrub-covered rises behind about 150 feet high. Stamford, North Side, and Winter hills can be seen when more than 2 or 3 miles off shore.

There are 6 to 7 fathoms water a quarter of a mile from the coast between Maclaren point and cape Donnington.

THORNY PASSAGE is bounded to the eastward by the north-western part of Thistle island, by Hopkins isle, and Black and Porter rocks; and on the west side by the south-east point of cape Catastrophe and the coast from thence northward towards cape Donnington.

Thorny passage is about 2½ miles wide at its narrowest part, between the south-east point of cape Catastrophe and Hopkins isle, from whence its width gradually increases to about 7 miles between Porter rock and the mainland. Several small islands, which lie between the north-western extreme of Thistle island and the south-east point of cape Catastrophe, so contract the southern entrance of this passage, that a width of one mile with 22 to 25 fathoms water, between the south-east point of the cape and Smith isle to the eastward of it, is the only safe ship channel in the southern entrance of Thorny passage. From 20 to 24 fathoms in the southern entrance of Thorny passage the soundings gradually decrease to about 11 fathoms westward of Porter rock.

Smith isle, the southermost of these small islands, lies E. ½ N. 1½ miles from the south-east point of cape Catastrophe, and S.W. nearly 2 miles from the centre of Hopkins isle; it is of an oval form, and flat-topped, half a mile long, N. by W. and S. by E., and 400 yards broad; it is 73 feet high, and covered with stunted vegetation. Smith isle is steep-to, with more than 20 fathoms water within a cable of it.

Lewis isle, North 1½ miles from Smith isle, differs in aspect from many of the other islands in Thorny passage, being round, peaked, and 128 feet high, while the others are all flat-topped. Lewis isle is a quarter of a mile long, N.N.W. and S.S.E., and little more than 200 yards broad, with 13 and 14 fathoms water close to it.

Little islet, N.N.W. a little more than half a mile from Lewis isle, is a mass of black granite of irregular form, 27 feet high, and about 150 yards in diameter.

Caution.—It is dangerous to pass between Little and Lewis isles, as the tide-streams sweep from one to the other at the rate of more than

3 knots, with strong eddies and ripples. It is most probable that H.M.S. *Investigator's* boat was lost between these isles, having been first filled by the ripple, and then dashed against Little isle. With a strong flood-stream these ripples extend more than half a mile northward from Little isle.*

GRINDAL ISLE, W. by N. ½ N. nearly 4 miles from the north extreme of Thistle island, and 2 miles from the mainland to the westward, is rather more than three-quarters of a mile long, North and South, and half a mile broad. It is 84 feet high, flat-topped and covered with detached bushes, which seem to spring up from a soil of white limestone lumps, and although apparently without a blade of grass, the island is used as a sheep run. Some rocks awash lie off the north-east point; and a coral ledge, with 4 to 7 fathoms water on it, extends three-quarters of a mile from the northern end of Grindal isle; but there are 9 to 10 fathoms at one cable from all other parts of the island.

TAYLOR ISLE, the south point of which lies N.W. ½ W. 1½ miles from Grindal isle, is the northernmost and largest island in Thorny passage, it being 1½ miles long, North and South, and about half a mile broad; its summit, which is near the north end, is 227 feet high. Taylor isle is rocky, with its eastern face forming a high cliff; and there is no other beach than a small one at the north-west point. It is mostly covered with scrub; but, the south end being grassy, the island has been used as a sheep run.

A small islet lies 3 cables off the north end of Taylor isle, with only 7 feet water between them; and a similar islet lies off the south end of Taylor isle, from which it is separated by only a boat passage.

Taylor isle is steep-to, except off its north-west side, where a sand-flat extends a quarter of a mile off shore to the northern islet. There is a clear channel 1½ miles wide, with 11 fathoms water, between Taylor and Grindal isles; and that between Taylor isle and the mainland, which is 1¼ miles wide, with 10 to 8 fathoms, is equally free from dangers.

Anchorage.—There is good anchorage in 9 fathoms water, marl, for large vessels, with the south point of Taylor isle bearing S.E., and a high and remarkable striped limestone cliff on the mainland bearing about S.W.

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* In these tide-ripplings H.M.S. *Investigator*, Captain Flinders, lost her master, a midshipman, and six men, by the upsetting or filling of a boat that was crossing over from Memory cove to the ship, at anchor off the north-west side of Thistle island, which renders care and daylight necessary in crossing this track, especially with a weather tide. —Flinders' "Terr. Aust.," vol. i. p. 135.

TIDES.—It is high water, full and change, in Thorny passage, at Noon; springs rise 6 to 8 feet. The tide-streams run North and South, through Thorny passage; the springs at the rate of 2 or 3 knots, and one knot between Taylor isle and the mainland. In the vicinity of the isles, between cape Catastrophe and Thistle island, there are tide-ripples, which are so violent as to swamp a boat.

Between Observatory point and Porter rock the flood sets to the north-eastward, and the ebb south-westward about 1¼ knots; but at the anchorage about one quarter of a mile eastward of Observatory point, the flood was sometimes found setting to the south-eastward, and the ebb north-westward, at about half a knot at springs, but with no regularity, the stream frequently running one way all day and night.

DIRECTIONS.—Thorny passage is very seldom used, there being little trade between port Lincoln and any ports to the westward; and it cannot be recommended to strangers, as the wind frequently dies away in the passage with a south wind outside, and some other wind in Spencer gulf, leaving a sailing vessel to the full influence of the tide-streams in deep water.

A vessel, however, desirous of proceeding northward through Thorny passage, with a strong fair wind, should pass the south-east point of cape Catastrophe at the distance of about 4 cables, and then steer North or N. ¼ W., so as to run between Grindal and Taylor isles.

If it be desirable to enter Thorny passage by the narrow channel between Smith and Hopkins isles, the rock southward of Hopkins isle will be cleared at the distance of half a mile, in 27 fathoms water, by keeping the east side of Lewis isle touching the west side of Grindal isle, bearing N. by W., until cape Catastrophe opens North of Smith isle, bearing W.S.W.

DANGEROUS REEF, the centre of which is N. ¼ W. nearly 14½ miles from the south point of Thistle island, E.S.E. 11¾ miles from cape Donington, and S. by W. ½ W. 8½ miles from Stickney island, is composed of four large rocks above water extending W. by S. 6 cables, and S.E. 7 cables from the centre of the largest one; none of them being more than 200 yards broad.

The highest rock is about 12 feet above water, and has been seen from the deck of the *Yatala* at a distance of 6 miles; there are several small rocks above water between the large ones.

There are 10 to 14 fathoms water half a mile off the reef all round, and the channel between it and Stickney island has 12 to 16 fathoms in it.

HOWARD or BEATRICE ROCK is W.S.W. 2¾ miles from the centre of Dangerous reef, between it and which there are 10 to 12 fathoms water.

The rock is a small knoll not more than 50 yards across, with 9 feet least water on it, and 7 to 9 fathoms close-to all round. It very seldom breaks. The channel between it and Porter rock is 4¼ miles wide, with 9 to 11 fathoms in it.

CAPE DONNINGTON, the south-east entrance point of port Lincoln, and N. by W. ½ W. 4¼ miles from Maclaren point, is three-quarters of a mile broad E.N.E. and W.S.W., and cliffy on its west side, above which is its wooded summit, about 175 feet high.*

Donnington Reef, a rock 10 feet high, lies N.N.E. ½ E. 3 cables from the north-east point of cape Donnington; there are 5 fathoms water at two-thirds of the distance from the cape towards the rock. A reef extends N. ¼ W. a quarter of a mile from the rock. There is one fathom water at the north extreme of the reef, and 6 to 7 fathoms close-to on its north, west, and east sides.

PORT LINCOLN.—The harbour known as port Lincoln consists of Boston bay, port Lincoln proper, and Spalding cove. The usual anchorage is off the township of port Lincoln, situated in the south-west part of Boston bay.

Port Lincoln is the finest harbour in South Australia, having ample room for a large number of vessels of the largest draught to lie perfectly landlocked; the land, however, in its immediate vicinity is poor, and it has never had a large population.

Rocket Apparatus.—In the event of a vessel being stranded at or near port Lincoln, and the lives of the crew being in danger, assistance will, if possible, be rendered from the shore.

Spalding Cove, between cape Donnington and Surfleet point, extends 3 miles South from the former, and is nearly 1½ miles broad throughout. The general depth to within one mile of its head is from 5 to 8 fathoms.

Its shores consist of low rocky points and sandy bays; on its eastern shore there is a good deal of sandy cliff, with scrubby rises at the back.

There are no dangers in Spalding cove, and anchorage anywhere, the best in the first bay South of cape Donnington.

With a strong northerly wind there is a short sea in the cove.

Surfleet Point, S.S.W. ¾ W. a little more than 2 miles from the west part of cape Donnington, is the western point of Spalding cove, and the north-east point of port Lincoln proper.

Bicker Islets, of which there are two, are each about half a mile in circumstance and 30 feet high; lying N. ¾ W. half a mile and nearly one mile respectively from Surfleet point. The northern one has 7 to 8 fathoms water at more than one cable from its north, west, and east sides. A ledge of rocks runs S. ½ E. from its south-east point half-way towards the southern islet, between which and the extreme of the ledge there are 2 fathoms.

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* *See* Admiralty chart, port Lincoln, No. 784; scale, *m* = 2·0 inches.

The southern islet is steep-to on its west side; rocks extend 50 yards from its north side; the east side should not be approached nearer than a quarter of a mile, and a stony bank extends S.E. 200 yards from its south-east point. There are 4 fathoms water midway between the southern islet and Surfleet point.

PORT LINCOLN PROPER is situated between Kirton and Surfleet points, and is more than 7 miles in depth in a south-west direction. The soundings in it are generally from 3 to 4½ fathoms.

Stamford Hill is 471 feet high, and the most conspicuous feature on the south side of port Lincoln proper. Its top is a quarter of a mile long North and South; the sides are covered with scrub. On its highest part is a monument of white marble erected by Sir John Franklin, R.N., in memory of Captain Flinders, R.N., the discoverer of South Australia.

North Side Hill has a conical summit, with a large boulder on one side, is 638 feet high, and the only conspicuous hill on the western side of the port. It is the southern summit of the range to which Winter hill and mount Liverpool belong.

Shores of Port Lincoln Proper.—From Surfleet point the shore trends S.W. by W. ½ W. nearly 1½ miles to a round rocky point under Stamford hill, there being two sandy beaches between. It then runs S.W. by S. 2¾ miles, and W. by S. nearly 2 miles, to near Horse rock, consisting of rocky points and sandy beaches, with low scrub-covered rises at the back, over which the sand-hills behind Sleaford bay are visible.

From the point near Horse rock the direction of the shore is W. ½ S. for more than 3 miles to the sandy beach at the head of the "proper;" its nature is low limestone cliffs, with hills covered by mallee scrub rising directly from them.

Between Surfleet point and a mile from the head of the port there are more than 3 fathoms water anywhere half a mile off shore.

From the north extreme of the sandy beach the low limestone coast trends N.E. ½ N. 4½ miles to the west end of a long sandy beach, where it turns to the eastward and south-east, forming a bay 1½ miles across. A flat dries to nearly one mile off this long beach, and there is not more than one fathom water North of a line W. ½ N. from the east point of the bay to the opposite shore. The north-west part of port Lincoln proper is generally shallower than the southern; the edge of the 3-fathoms bank runs from close to the south extreme of Grantham island to a spot where there are 2¾ fathoms N.W. one mile from the Horse rock, and thence continues quite one mile off shore to the head of the port. A sandy spit, which dries, extends 600 yards off shore from the sandy beach, which is N.E. 1¼ miles from the head of port Lincoln proper.

Horse Rock is S.W. by W. ¾ W. 4¼ miles from Stamford hill, and S. by W. ¾ W. rather more than 1½ miles from the south-west point of Grantham island, between it and which there are 4 to 4¾ fathoms.

The rock is of small extent, and not more than 2 feet above high water, and is connected with a point on the southern shore, S.E. ¼ E. 3 cables from it, by a sandy spit with 2 feet on it at low water.

Grantham Island, the centre of which is West 3 miles from Stamford hill, is three-quarters of a mile long N.E. by N. and S.W. by S., a quarter of a mile broad, and 50 feet high. Its shores are cliffy, with rocks extending a short distance off; it is covered with scrub, and rabbits abound on it. There are one to 1¾ fathoms water between the island and the shore N.W. of it; the other side is steep-to, there being 4¼ to 5 fathoms one cable off it.

The COAST from the point near Grantham island takes the direction of N.E. ½ N. for 2 miles to the east point of Porter bay. There are two slightly projecting points between, each having a scrub-covered hill about 150 feet high behind it. The shore is low cliff, with small sandy beaches. There are 5 to 6 fathoms water a quarter of a mile off shore to the N.E. of Grantham island.

A Shoal, with 3 fathoms water on it, and 200 yards in extent, lies West 1¼ miles from Horse rock, and S.W. ¼ W. 2¼ miles from the south-west point of Grantham island. There are 4 to 4¼ fathoms for half a mile to the northward and eastward of the patch, but not more than 3¾ fathoms between it and the southern shore.

A Bank, with 3¾ fathoms least water obtained on it, lies S.S.W. ½ W. 2 miles from the south point of Boston island; there are 5 to 6 fathoms all round it, but another patch with 4 fathoms water, mud, lies N.W. by W. ¾ W. 4 cables from it.

DIRECTIONS for PORT LINCOLN PROPER.—Between Boston island and cape Donnington. With a fair wind it is better to pass between cape Donnington and the rock off it, rather than north of the rock.

In passing north of the rock, to clear the Donnington reef, do not bring the rock southward of S. by W. or in line with the east side of cape Donnington, until the summit of the South Bicker islet is seen open to the right of cape Dounington, S.W. ½ S. For a vessel drawing less than 21 feet there is then nothing to avoid until to the westward of Grantham island. When standing towards the north-west shore of port Lincoln proper to keep in not less than 3¾ fathoms, a vessel should tack when the north extreme of the South Bicker islet is nearly in line with the south extreme of Grantham island, N.E. by E. ½ E. To clear the 3-fathoms shoal S.W. of Grantham island, the summit of North Bicker islet in line with the south extreme of Grantham island, N.E. by E., leads 3 cables N.W. of it in 4 fathoms; and the south-east extreme of Boston island in line with the south extreme of Grantham island, N.E. ¼ E., leads to the southward and eastward of it in 3¾ to 4 fathoms.

Anchorage.—There is good anchorage anywhere in port Lincoln proper, according to draught. The anchorage at the head of the port where wool is shipped from the beach, is in 4 fathoms, with North Side hill bearing North, and a black point at the south extreme of the beach at the head, W. by S.; and in 2¼ fathoms, at a little more than half a mile from the beach, with the same objects bearing N. by E. and W.S.W. respectively.

Boston Island is nearly 4 miles long N. by W. and S. by E., and 1½ miles broad at its widest part; it is prettily wooded with shea oaks and small gum-trees, and in the winter covered with very green grass. The island is generally hilly, its summit near the centre being 319 feet high. Maria point, the north extreme of the island, is low and rocky, the end of a narrow projection about 40 feet high.

On the western shore, at rather more than half a mile from Maria point, is a small white cliff, with a house near; a rocky reef with 3 feet water on it runs W.S.W. nearly 3 cables from this cliff; it is 200 yards broad, and has 4½ to 5 fathoms close to. The west side of Boston island is composed of sandy bays and sloping points, with low rocks at the water's edge, and except near the reef mentioned there are 8 fathoms a quarter of a mile off shore. The south point is low and very narrow; a reef with 1½ fathoms at its extreme projects S.S.E. one cable from it. Between the south point and a point N.E. by E. ½ E. 1¼ miles from it, the coast bights in nearly three-quarters of a mile, forming a bay with 6 to 8 fathoms at more than 2 cables from the shore. Rocks extend off the eastern part of the east point of the island, N.E. by E. ¼ E. 2 cables.

The eastern shore of the island is rather steeper than the western, and has 8 to 10 fathoms water a quarter of a mile off, except about Kangaroo reef, off the north point of Boston island.

Kirton Point is more than half a mile broad facing to the N.E., and is W. ¾ N. 2 miles from the south point of Boston island, the water between being 6 to 9 fathoms. The summit of the point is a round scrubby hill 220 feet high. There are 6 to 8 fathoms 2 cables off the point.

Porter Bay.—South of Kirton point the coast forms a bay nearly one mile across and three-quarters of a mile in depth.

The head of the bay is a sandy beach, at the centre of which the waters of an extensive swamp at the back discharge themselves. Off the beach there are 4 fathoms at more than half a mile out. There is a scrubby hill 206 feet high, south of the beach. The south coast of the bay is low rocky cliffs and sandy beaches; the hills behind are covered with mallee scrub, good for fuel.

Rocks uncovered at low water, and foul ground extend a quarter of a mile off the east point of the bay.

BOSTON BAY is included between Kirton and Boston points, and protected to seaward by Boston island. The depth in the greater part of it is from 9 to 6 fathoms. It is free from danger, with the exception of the following:—

Kangaroo Reef, a rocky patch extending between N.E. ¾ N. and E. by N. nearly 6 cables from Maria point. Its shallowest part is a rock awash at low water N.E. by E. ¼ E. 4 cables from Maria point; it has one to 3 fathoms over it, with 5 to 8 close to. The channel between it and Boston point is one mile wide, with 8 fathoms in it.

A bank, with 3½ fathoms least water on it, bottom soft mud over rock, lies N.N.E. ½ E. 1⅔ miles from port Lincoln jetty end, and one mile from the western shore of the bay. It is 600 yards long N.W. and S.E., 200 yards broad, and has 7½ to 8½ fathoms close-to all round.

Port Lincoln Township is situated close to the sea in the valley between Kirton point and the range continuing south from Winter hill. It has a jetty 700 feet long, having a crane on it, with 11¾ feet water, near the end on its western side. Population in 1881, 530 persons.

The weekly steam vessel between Adelaide and port Augusta discharges cargo alongside, and so do the small craft trading there. Very good water can be obtained at a spring on the beach, N.N.W. eight-tenths of a mile from the jetty end; and provisions at the stores.

Port Lincoln and the whole district to the westward is rather isolated from the rest of the colony. The exports of port Lincoln are principally wool, wheat, and oysters, the latter being carted overland from the inner waters of Coffin bay; much of the trade which might go to port Lincoln is shipped at different points along the coast to the northward, and land carriage thus avoided; the coasting steam vessel calling in anywhere where cargo is collected.

There is a telegraph station at port Lincoln.

Rockets with the usual apparatus for saving life from shipwreck are supplied to the officer in charge at port Lincoln.

From Kirton Point a sandy beach which fronts the township trends West half a mile, and N.W. half a mile; the coast then trends North 6 miles in almost a straight line to the N.W. part of Boston bay; it is composed of red sandy cliffs, with stony and sandy beaches at their base, and may be approached anywhere to within half a mile. A wooded range slopes down to this part of the coast, cultivated near the shore; it is lowest behind the north-west part of the bay, and rises gradually to the southward, attaining its greatest elevation at Winter hill, which is 771 feet high, with a long flat summit, and is 1¼ miles inland from the south-west part of the bay.

From the north-west part of Boston bay (behind which is the small village of North Shields) the coast turns to the eastward, and is a long sandy beach, with low sand-hills behind for 2½ miles; from the east end of the beach to Boston point it is S.E. 2 miles, the coast being sandy beaches and low rocky points, with a hill 170 feet high, above, and sloping gradually down to Boston point.

BOSTON POINT.—The north-eastern entrance of Boston bay is broad and low. It is N.E. by N. 1¾ miles from Maria point, and there are 7 fathoms water at the distance of one cable from it.

The peninsula which runs out to Boston point has two round grassy hills on it, and is connected with the mainland by a narrow neck of land partially covered with vegetation.

DIRECTIONS.—For the northern entrance between Boston point and Boston island, Boston point may be rounded close-to. A vessel should stand to the westward directly after passing it until North Side hill is open to the right of the western extreme of Boston island S.W. ¼ S.; this mark clears the Kangaroo reef to the westward. To clear Kangaroo reef to the eastward keep mount Gawler in line with the eastern extreme seen of the long sandy beach in the north part of Boston bay, N.N.W. ¾ W. This mark leads half a mile N.E. of the reef in 10 fathoms. To clear the reef in the bay, off the cliff point of Boston island, keep Boston point open of Maria point until the white cliff bears to the northward of N.E. by E. To clear the 3½-fathoms bank in Boston bay, North Side hill in line with the outer end of the jetty S.W. ½ S., leads a quarter of a mile to the eastward in 8 to 9 fathoms water; and the Roman Catholic chapel, which is somewhat elevated, and half a mile inland from the jetty, in line with the outer end of the jetty S. by W. ¼ W., leads a quarter of a mile west in 9 fathoms.

By the entrance between cape Donnington and Boston island.—For rounding cape Donnington the directions have been given in those for port Lincoln proper. In working into Boston bay to avoid the bank S.S.W. from the south point of Boston island. When standing to the southward in that part of the entrance a vessel should tack when the summit of cape Donnington is in line with the north extreme of the North Bicker islet E.N.E., and if of sufficient draught to need more than 4 fathoms should not go within half a mile of the east point of Porter bay. Give the south point of Boston island a berth of a quarter of a mile in passing, and keep the same distance off Kirton point and the beach to the westward.

Anchorage.—A vessel may anchor almost anywhere in Boston bay; it is all well protected and good holding ground. The usual anchorage is off the township, with the jetty bearing S.W. ½ S. in 2¼ to 3 fathoms one cable off, and 5 to 8 fathoms 4 to 6 cables off. The bottom is mud and shells.

TIDES.—It is high water, full and change, in Boston bay at 1h. 50m., springs rise 6 feet. There is very little tidal stream in any part of port Lincoln. At 2 or 3 miles off the coast outside, the flood sets to the northward, and the ebb to the southward, its greatest strength being from 1½ to 2 knots per hour.

LOUTH BAY lies between Boston point and Bolingbroke point, and is about 6 miles deep in a N.W. direction. The formation of the coast divides it into three distinct bays, one between the point 2½ miles North from Boston point and Louth island; another between Louth island and a cliff point W.N.W. 3¾ miles from Bolingbroke point, and the third between the last-mentioned two points.

The Southern Bay is 1¼ miles across between the south point of Louth island and the point opposite on the mainland, and 2¼ miles deep. It is shallow; the shore has a bank drying off a quarter of a mile, and there is less than one fathom water half a mile further out. At the entrance there are 4 fathoms nearly all the way across, and there are 2½ to 3 fathoms half a mile off the whole extent of the south-western shore of Louth island.

Todd river discharges itself into this bay; the mouth is generally blocked up with mud and weed. The Missionary station at Poonindie is on the north bank of Todd river, one mile from the mouth, the mission church being visible from the bay.

Todd river is the most western river in South Australia; a few small rivulets discharge into port Lincoln during the winter, but from thence to the western boundary there is no river or fresh water stream whatever.

The Second Bay is more than 3 miles in depth, with from 4 to 8 fathoms in it, and a general depth of 5 fathoms half a mile from the shore. The shore consists of rocky points and sandy bays, with high, well wooded, and cultivated land behind.

The jetty, 150 feet long, for shipping off wool, &c., is in the small cove, west of a point, N.N.W., 2 miles from the north-west point of Louth island.

There are 2½ fathoms at 4 cables off shore, with the north-east extreme of Louth island just open of the point. N. ¾ E. 8 cables from the north extreme of the point near this anchorage, and a quarter of a mile from the beach, is a small rock with 3 feet water on it. There are 1½ fathoms between it and the beach, and 3½ fathoms all round elsewhere.

Anchorage.—There is anchorage in the southern part of the bay, under the sandy bar connecting Louth island with the mainland.

The Northern Bay is nearly 3 miles in depth, with from 2 to 7 fathoms water in it, and with a general depth of 3 fathoms three-quarters of a mile from the shore. The coast is red cliffy points, and sandy beaches, with sand-hills immediately behind, and beyond them low rises covered with dense scrub.

There is a rock with one fathom water on it, N. by E. ½ E. a little more than 1½ miles from the western point of the bay, and nearly half a mile off a red rocky point. There are 3½ fathoms directly to the eastward of it, and 2½ fathoms between the rock and the nearest point.

Hawker's Devil is a rock awash at low water, lying N. by E. 1¼ miles from Boston point, and 7 cables off shore. There are 6 fathoms water half a mile East of it.

Rabbit Island is N.E. ½ N. nearly 3½ miles from Boston point; it is half a mile long North and South, 400 yards broad, 32 feet high, and cliffy on its eastern side, from which it slopes gradually down to its western shore. A rock awash at low water lies North 3 cables from its north point, with 3 fathoms 2 cables further north. The island may be approached as near as a quarter of a mile anywhere else; there are 6 to 7 fathoms water between it and Louth island.

Louth Island, the south extreme of which is N. ¾ E. nearly 3½ miles from Boston point, is 1½ miles long N. by W. and S. by E., and from three quarters to one quarter of a mile wide; it has two wooded summits, each about 76 feet high. The shore all round the island is formed of rocky points and sandy bays, its eastern side is safe to approach to a quarter of a mile. A dry sand-spit extends 800 yards W. by N. ½ N. from the north-west point; this spit is connected with the shore of Louth bay by a sandy bar nearly dry at low water.

BOLINGBROKE POINT, N.E. 9¾ miles from Boston point, is a round rocky point about 40 feet high. A reef with less than one fathom water on it extends half a mile South from its south extreme.

Bolingbroke Reef extends to the westward from Bolingbroke point, the extreme having 2¾ fathoms water on it, with 6 to 7 all round, except between E.N.E. and E.S.E. from it; the extreme bears West a little more than 2½ miles from the point. Its shallowest part is a rock with less than one fathom water on it, W. ½ N. about 1½ miles from Bolingbroke point.

Aspect of Louth Bay.—There is a fine range of hills running parallel to the western shore of Louth bay, about 2 miles inland. The highest of this range is mount Knott, a well-wooded flat-topped hill, 832 feet high, and W. by N. 2 miles from the point near the shipping place. Another remarkable hill is mount Gawler, 808 feet high, also flat-topped, and S.W. by W. ¾ W. 2 miles from mount Knott. Mount Gawler is hidden by mount Knott from a spectator at the north-east part of Louth bay.

To the northward of mount Knott the range is lower, with no remarkable hill until mount Liverpool is reached, the round summit of which, 1,055 feet high, is very conspicuous from Louth bay, as is also a conical hill of about 300 feet less elevation, bearing E.N.E. 1½ miles from mount Liverpool. All the range is well wooded with shea oaks.

From the foot of the high range out to Bolingbroke point, the country is all low hills between 200 and 300 feet high, and covered with dense scrub. The land west of Louth bay is of a better nature, being well grassed, with open wood on it.

DIRECTIONS for LOUTH BAY.—From the Southward.—To clear Hawker's Devil.—Passing east of Rabbit island; Bolingbroke point open east of Rabbit island N.E. clears it; and passing between Rabbit and Louth islands, mount Liverpool over the eastern extreme of Louth island N. ½ W., leads well to the eastward of the rock.

To clear the rock north of Rabbit island, keep mount Knott in line with, or open to the right of the north point of Louth island, N.W. by W. ¼ W. In going to the usual shipping places, if standing towards the spit between Louth island and the shore, a vessel should tack when the north extreme of Rabbit island is just shut in with the north-east extreme of Louth island S.E. ¼ S.

From the Northward.—In rounding Bolingbroke point do not approach it nearer than three-quarters of a mile, or shoal the water to less than 6 fathoms. When it can be seen, the south extreme of Reevesby island just open right of Kirkby island, E. ¾ N., clears the foul ground off Bolingbroke point, and Bolingbroke reef to the southward. In standing towards Bolingbroke reef from the southward, Bolingbroke point should not be brought to bear eastward of E. by N., or the water shoaled to less than 5 fathoms. A vessel is clear of the reef to the westward when mount Liverpool is over the western extreme of the west point of the north bay, N.N.W. ½ W. Northward of the Bolingbroke reef, Bolingbroke point should be kept to the southward of E. by S., or the water not shoaled to less than 5 fathoms until within three-quarters of a mile of the shore, when the chart will be the best guide.

Anchorages.—The best anchorage in Louth bay was found to the northward of Louth island spit, in 3½ fathoms, sand, with the extremes of Louth island bearing S.E. by E. and S. by E. Good anchorage with all but southerly gales will be found off the first long sandy beach north-west of Bolingbroke point, in 3 fathoms, sand; with the west extreme of Bolingbroke point S. by E. ½ E., and the right extreme of some rocks which stretch off the middle of the beach N.E. ½ E.

SIR JOSEPH BANKS GROUP consists of 20 islands, islets, and rocks, above water, lying East of Louth bay and Bolingbroke point. Reevesby and Spilsby are the only ones on which water is obtainable, and where the vegetation is higher than low bushes. The islands are used for pastoral purposes.

There are several good anchorages amongst them. They are all frequented during the breeding season by great numbers of cape Barren geese; the young ones are fit to rear about August, and can then be easily run down and caught. The old birds come to the islands in the latter end of May and leave when the young can fly in October.

Kirkby Island is East a little northerly about 6 miles from Bolingbroke point; its form is that of a haycock; it is one mile in circumference, and 85 feet high. A small rock, with 5 fathoms water on it, lies N. by E. ½ E. 7 cables from Kirkby island; it does not break, and has 10 to 11 fathoms all round.

The centre of a rock awash bears N.N.E. 1¼ miles from Kirkby island; a narrow reef, with less than one fathom water on it, extends 500 yards E. by N., and the same distance W. by S., from the rock. There are 10 fathoms midway between the reef and the 5-fathoms rock, and 11 fathoms half a mile off, either to the westward or northward.

To clear the reef, from the southward or westward, keep Sibsey island open west of Kirkby island S. ¼ W., until Winceby island is open north of Partney island N.E. by E.; the latter mark kept on, leads well clear and to the northward of the foul ground.

To pass between the reef and Kirkby island, keep the clump on the south hill of Reevesby island over the south extreme of Lusby island E. ¼ N.; or in standing towards the rock, do not bring the clump much north of the centre of that island. A vessel is to the eastward of the rock when the western extreme of Langton island is open of the eastern extreme of Dalby island S. by E. ¼ E.

Sibsey Island, the westernmost of the group, is S. by W. 5¾ miles from Kirkby; it is about 80 feet high, half a mile long North and South, and a quarter of a mile broad. There are 7 to 11 fathoms water close to, all round it. A rocky islet (English islet) about 15 feet high lies N.E. ¼ E. 9 cables from the summit of Sibsey island; it is steep-to, and there are 7 to 9 fathoms between it and Sibsey.

Stickney Island is S.S.E. 8 miles from Kirkby, and 100 feet high. It is less than one mile across, and has two deep inlets which run nearly through it; there is good landing in the one on the northern side of the island. A rock above water, and connected with the island by rocks which cover and uncover, lies 2 cables S.E. from the south-east point of Stickney. The island has 9 to 15 fathoms water within half a mile of it all round.

Spilsby Island is S.E. ½ E. 9¼ miles from the summit of Kirkby. This is the highest, and only wooded and inhabited island of the group; its northern part, which rises to a round summit 162 feet high, being well clothed with shea oaks. It is 2 miles long North and South, and 1½ miles wide in its northern part; its southern end is a narrow point three-quarters of a mile long, and a quarter of a mile broad. Its shores consist of low cliffs, rocky banks, and sandy beaches with sand-hills behind them. There is fresh water in a well among the sand-hills at the north-west point of the island.

A spit with less than one fathom water on it runs off the north-west point, N.N.W. ½ W. 6 cables, with 2½ fathoms at 3 cables farther out in the same direction, and 8 fathoms directly outside the latter.

There is a small islet about 20 feet high, W.S.W. 8 cables from the north-west point of Spilsby. A ledge of rocks extends 2 cables S.S.W. from the south-west point of the islet. There is deep water between this islet and Stickney, but directly between it and Spilsby 1¼ fathoms is the deepest.

The south-west side of Spilsby has ledges of rocks which uncover with the tide, jutting out 400 yards from the shore.

A covered reef, 800 yards in extent, lies W. ½ S. one mile from the south point of Spilsby; there are 1¾ to 2½ fathoms between it and the shore, and 7 to 8 fathoms close-to to seaward. The rock N.E. of Sibsey in line with the north-east extreme of Stickney, N.W. by W. ¾ W., leads to the southward; and Kirkby summit over the west extreme of Langton N.W. ¾ N. leads to the westward of the reef.

The east side of Spilsby is rocky, but may be approached as near as half a mile. Three-quarters of a mile from the north-east point, and N.E. by E. ¾ E. nearly 1¼ miles from the summit of Spilsby, is Boucaut islet 32 feet high, and about three-quarters of a mile in circumference; S.E. ½ E. 4 cables from the centre of the islet is Seal rock about 10 feet high, connected with the islet by rocks which uncover at low water.

The channel between Spilsby island and Boucaut islet has 1½ fathoms water in the middle; it sometimes breaks across. There is deep water northward of the islet, but only 3 fathoms a quarter of a mile East of Seal rock, and E. by N. ½ N., 1¼ miles off the north-east point of Spilsby.

Anchorage.—Due North of the centre of Spilsby island there is good anchorage in 5 fathoms water a quarter of a mile off shore, with the wind between West, round by south to S.E.

Anchorage in 3 fathoms may be found during easterly winds, with the extremes of Spilsby bearing E. ½ N. and S. by E. ½ E.; this is close to the edge of the bank with less than one fathom on it, which runs off the whole of the north-west side of Spilsby to a distance of 600 yards from the beach.

BUFFALO REEF, discovered by H.M.S. *Buffalo* in 1836, lies S.E. by E. ½ E. 6¾ miles from the summit of Spilsby island. It is a rock above water, about 10 feet high, 400 yards long East and West, and 50 yards broad. Rocks under water extend 2 cables West, and one cable N.E. from its western, and its eastern extremes respectively; otherwise it is steep-to. There are 15 fathoms half a mile North of the reef, and 21 fathoms the same distance off elsewhere. The sea sometimes breaks with great violence on this dangerous reef.

The channel between Buffalo reef and Spilsby island is free from danger.

Roxby Island lies E.S.E. 5¾ miles from Kirkby island; it is one mile long East and West, 400 yards broad, and 74 feet high; and is separated from Hareby island by a channel half a mile wide, with 2½ fathoms water in it. Its north and east sides are cliffy, and the rest of its shore sloping points with small sandy beaches. A reef, with a rock awash at low water, runs off the south-east point of the island S.S.E. ½ E. half a mile. There are 4 to 6 fathoms close to this reef on its east, south, and west sides.

With this exception there is no danger farther than a quarter of a mile from the island. Kirkby over the middle of Dalby island, bearing N.W. by W. ½ W. leads to the southward and westward of the reef, and the shoal water south of Hareby island. The clump on Reevesby island over the north-east extreme of Roxby island N.W. ¼ N. leads clear to the eastward and northward of it.

Hareby Island, E. by S. ¾ S. 4½ miles from Kirkby, is 8 cables long E. by S. and W. by N., and 2 cables broad; its highest part is its eastern end, 49 feet above water. Rocks which dry for about half the distance extend W. ¾ S. half a mile from its west point; there is shallow water a quarter of a mile farther out on the same bearing. Six cables North from the north point of Hareby island is Blyth island a round sandy islet, 38 feet high; and 3 cables N.E. by E. from the summit of the latter is a rock above water, connected with the island by rocks which uncover at low water.

Between Hareby island and Blyth island, enclosing the latter and extending N.W. by W. 1½ miles from it, is a bank half a mile East and West, with from one-quarter to three-quarters of a fathom generally on it, and 1½ fathoms at its north-west extreme. There is a channel between the north extreme of this bank and Reevesby island, with 2½ fathoms in it. There are 2½ to 3 fathoms water between Hareby and Roxby islands.

Anchorage may be found with westerly or southerly winds under the lee of this bank, with Blyth island bearing N.W. by W., and the north extreme of Hareby island S.W. by W.

Langton Island is S.E. ½ S. 3½ miles from Kirkby island; it is 6 cables long E.N.E. and W.S.W., 2 cables broad, and 30 feet high. Its north-east part is a sandy bank 2 cables in length. There are only 2 fathoms water at 2 cables off its north-west point, but it is safe to approach as near as half a mile on its north, south, and west sides.

Smith Rock, which is awash at high water, is N.N.E. ½ E. half a mile from the north-east point of Langton island. There are 1½ fathoms at 2 cables E.S.E. from it, 2 fathoms the same distance N.E. by N., and 3½ fathoms midway between it and the north-east point of Langton island.

The summit of Kirkby island over the centre of Dalby island N.W. by W. ½ W., leads in 3½ fathoms, which is the deepest water in the narrow channel between Smith rock and Hareby island.

Dalby Island, S.E. by E. ½ E. nearly 1½ miles from Kirkby, is a quarter of a mile long N.N.E. and S.S.W., 200 yards broad, and 29 feet high. It is steep-to, with deep water between it and all the islands near.

Reevesby Island is the largest of Sir Joseph Banks group. Its southern extreme is E. ½ N. 3 miles from Kirkby, above which is its highest part, a round green hill 107 feet high and three-quarters of a mile in diameter, with some bushes forming a clump near the top. From the north part of this hill the island extends N. ½ E. 2½ miles, varying from a quarter to half a mile in width, and from 20 to 40 feet high, the coast being sandy beaches with low rocky points. From the north part of the island, a narrow sandy neck and a peninsula half a mile long with a sand hill 66 feet high for its summit, extend East 1½ miles.

The eastern shore of Reevesby island is steep-to, there are 10 to 11 fathoms one mile off. On the west side, one mile from the north point of the island, a sandy spit, with a rock awash at its extreme, extends 4 cables from the beach.

Anchorage.—North of this spit there is good anchorage, except with North and N.W. winds, in from 5 to 3 fathoms water. The surveying vessel *Beatrice* usually anchored in 3½ fathoms, a quarter of a mile from the beach, with the house on Reevesby bearing E. by N.

Water.—There is a well in the middle of the island about a third of a mile S.S.E. from the house.

TIDES.—It is high water, full and change, at this anchorage at 2h. 30m.; springs rise 6 feet.

Lusby Island is very small and 29 feet high, lying W. ½ N. one mile from the south summit of Reevesby island. It is connected with that island by a sandy bar which dries at low water. Rocks which dry in patches at low water extend between North and West 3 cables from its north-west point; between these rocks and Marum island there are 4 to 5 fathoms.

Between Lusby and Kirkby there are 9 to 10 fathoms.

Marum Island is N. by W. ¼ W. one mile from Lusby island; it is of an irregular shape, half a mile across, and about 30 feet high. A rocky patch with less than one fathom on it, lies W. ½ S. 7 cables from the centre of the island. Between the southern part of Marum and Reevesby islands there are 1½ to 3 fathoms, and 4 fathoms midway between the northern part of Marum and the extreme of the spit off Reevesby.

Anchorage.—A small vessel may find anchorage with N.W. and northerly winds S.E. of Marum, and if not drawing more than 9 feet, run between it and the spit for Reevesby anchorage, when the wind shifts to the westward and S.W.

Clearing Mark.—Winceby island kept open to the northward of Partney island, N.E. by E., clears all the dangers west of Marum island.

Partney Island is S.W. by W. ¾ W. 1½ miles from Reevesby north point; it is 29 feet high, quarter of a mile long N.W. and S.E. and a quarter of a mile broad. There are 5 to 6 fathoms water between it and the northern part of Reevesby; the island is steep-to on its north and west sides. It is connected with Marum island on its south-east side by a sandy spit which dries in places.

Winceby Island, the northern island of the group, is N. ¼ E. one mile from the north point of Reevesby island; it is 33 feet high, half a mile long N.W. and S.E., and a quarter of a mile broad. The channel between it and Reevesby has 2¼ to 4 fathoms water in it.

The COAST between Bolingbroke point and Tumby island runs in a northerly direction, and consists of low red cliffs and sandy beaches, with rocks which dry, extending in some places, half a mile from the shore. [illegible] point which is N.N.E. ½ E. 2 miles from the south extreme of Boling- point has Secret rock lying E. by S. ¼ S. nearly half a mile from it;

this detached rock is of small extent, awash at low water, with 2 to 3 fathoms water all round it, and 5 fathoms half a mile to seaward.

The Colonial steam vessel *Governor Musgrave*, in 1876, scraped over a shoal one mile from the shore and bearing East nearly from Secret rock. At the time the extreme of Bolingbroke point bore S.W. ½ W.; immediately after clearing the shoal a depth of 4½ fathoms was obtained.

Rabbit island open of Bolingbroke point S.W. ¾ W. clears Secret rock in 5 to 9 fathoms, and passes half a mile S.E., and three-quarters of a mile East of it.

North 7½ miles from Bolingbroke point is the entrance to a swamp; from whence the sandy beach curves round to a low point, the spit from which curves half a mile to the northward and connects Tumby island with the mainland. The shore should not be approached nearer than one mile between Bolingbroke point and Tumby island.

TUMBY ISLAND, N. by E. ½ E. 8½ miles from Bolingbroke point, is 800 yards in extent N.W. by N. and S.E. by S., and 500 yards wide. Its north-west part is 3 cables from the low point mentioned above. The island is cliffy except on its northern side, where there is a sandy beach, and of nearly equal height all round, its highest part being 37 feet above water.

A rocky ledge, dry at low water, runs from the north-east point of the island N.E. by E. half a mile, and then curves to the southward S.E. by S. for 3 cables to its south point, which is E. by N. 6 cables from the centre of the island. A reef composed of rocks awash at low water extends S. by E. half a mile from the south point of the island; there are 4 fathoms a few yards South of this reef, and the same water one mile East of it: and 3½ fathoms at a little more than one mile North from the centre of the island.

HARVEY BAY (Tumby Bay) is a bight in the coast nearly 3 miles deep, between Tumby island and Salt creek. It is rather shallow, there being depths less than 5 fathoms to an average distance of 2 miles from the shore. From the point near Tumby island, the low sandy coast forms a small bay N.W. 1½ miles across to a low rocky point.

From the low rocky point, the shore of the bay—a sandy beach, with a wooded bank behind—curves to the northward and north-east for 4 miles to the mouth of Salt creek. A rock awash at low water, with a few dry rocks between it and the shore, lies N. by E. ½ E. 3 cables from the low rocky point.

The entrance to a swamp is on the west side of this point; and there is a jetty half a mile North from it, where a remarkably good macadamised road to port Lincoln and the Burrowing mine leaves the beach. The jetty is 525 feet long with 10 feet at low water at its outer end, and has a crane on it. The copper and agricultural produce of the district are shipped here.

Anchorage.—The best anchorage for small vessels in Harvey bay is off the centre of this beach in 2½ to 3 fathoms water, with the north extreme of Tumby island bearing S.E. by E. ½ E.

Salt Creek is a stream which discharges itself into the sea at the north-east point of Harvey bay. There are only 2¾ fathoms water 1¼ miles S.E. from the north-east point of Harvey bay, and 5 fathoms one mile farther out. The edge of this bank continues from one mile to half a mile off shore as far as the north extreme of the long sandy beach to the northward, and is quite a mile from the beach along the whole extent of the north-west part of Harvey bay.

Aspect of Coast.—When 3 or 4 miles East of Tumby island the sheep hills are conspicuous to the northward, the low land at the back of Harvey bay is scarcely visible; the red cliffs of Tumby island and the coast between it and Bolingbroke point show out to the westward, the low hills near, which are covered with dense scrub, scarcely appearing above the cliffs; and inland is seen the fine range of which mount Liverpool—bearing W. ¼ N., 9¼ miles from Tumby island, and 1,055 feet high—is the most conspicuous and elevated summit. To the southward and south-east Kirkby island appears like a haycock, and Reevesby and the adjacent islands are seen to the left.

DIRECTIONS.—In rounding Tumby island it should not be approached nearer than one mile. Do not shoal the water to less than 6 fathoms until the island bears to the southward of S.W. With Tumby bearing S.W. one mile, the course to the usual shipping place is N.W. by W. ½ W. 2½ miles, or keeping the low rocky point near there well on the port bow.

In entering Harvey bay from the northward, keep about 1½ miles off shore until mount Liverpool bears W. by S. ½ S. Then alter course to the westward, keeping the mount half a point on the starboard bow. This course leads direct for the shipping place, where a vessel may anchor according to her draught, there being 3 fathoms half a mile off shore. In standing towards the northern shore of Harvey bay, mount Liverpool should not be brought to bear southward of W. by S. ½ S. to keep in more than 2½ fathoms.

The COAST.—From Salt creek to Lipson cove the coast trends about N.E. ½ N. 7 miles; a sandy beach, with low land immediately behind, for 3½ miles, and high rocky points with small sandy beaches as far as the cove.

LIPSON COVE is formed by a sandy beach on the mainland, and a rock which runs out in a north-easterly direction 2 cables from the point at the south end of the beach. The cove is N.N.E. ¾ E. 10¾ miles from Tumby island.

Anchorage.—There is anchorage for one or two small vessels in 3 fathoms water midway between the north-east extreme of the rock and the north end of the beach; it is only 3 cable across, leaving little room for a vessel to get under weigh with a north-easterly wind. Anchorage should only be sought there when the wind is off the land and likely to continue so.

The chimneys of an abandoned copper mine in the first little bay south of Lipson cove are still standing and visible from the sea. The land in the vicinity has been surveyed for an agricultural area, and will doubtless soon be settled on by farmers. There is a jetty 330 feet in length with 8 feet water at its outer end.

Water.—A well of excellent water is 50 yards back from the middle of the cove beach. No water is to be found on the shore northward.

Cape Hardy.—A grassy knob, 97 feet high, is N.N.E. ½ E. 5¾ miles from Lipson cove; the coast between being of the same nature as that south of the cove.

A wooded range named Sheep hills, the summit of which, 432 feet high, bears N.N.W. distant 2 miles from Lipson cove, runs parallel to the coast as far distant North as cape Burr.

CAPE BURR is 4 miles N. by E. ¾ E. from cape Hardy, the coast between being rocky points and sandy bays. From Lipson cove to cape Burr the coast is steep-to, there being 5 fathoms at less than half a mile off shore.

The edge of the 10-fathoms bank is half a mile off Lipson cove and cape Hardy, and 1½ miles from cape Burr.

Anchorage.—There is good anchorage for small vessels in the bight north of cape Burr, in 3 fathoms, with the extreme of the cape bearing S.S.E., three-quarters of a mile distant.

Mount Hill, W. by N. ¾ N. 8½ miles from cape Burr, a truncated cone 1,240 feet high, standing by itself, is the highest and most conspicuous landmark about this part of the coast.

DUTTON BAY.—From cape Burr to a sandy point N.E. ½ N. 11 miles from it, the coast trends in a slight curve forming Dutton bay. The features of the coast are sandy bays, with higher cliffs than those south of cape Burr, the country immediately behind being lower, and covered with dense mallee scrub.

The edge of the 3-fathoms bank is nearly a mile off shore in the south part of Dutton bay, and the same distance off its northern sandy point; the 5-fathoms line is 1½ miles off the former part, and 1¾ miles off the latter, but less than half a mile off shore in the middle of the bay, where the cliffs are highest. The 10-fathoms line is 5 miles off shore midway between cape Driver and cape Burr, and only three-quarters of a mile off cape Driver.

Anchorage.—There is good anchorage for small vessels on the bank in the north part of Dutton bay, in 3 fathoms water, sand, with the extreme of cape Driver N.E. ½ N., and the south-west extreme of the long beach in the north part of the bay W. by S.

The COAST.—From the north point of Dutton bay, behind which the land is very low, the coast trends N.E. 3 miles to a red cliffy point 67 feet high; this point is very similar in appearance to cape Driver, on to which it is N.E. ½ E. 1¾ miles.

CAPE DRIVER, N.E. ½ N. 15½ miles from cape Burr, is a broad point extending more than half a mile N.N.E. and S.S.W., 53 feet high, with rocky ledges a quarter of a mile off it.

SALT CREEK COVE, locally known as Ano, is the first bight, about one mile North of cape Driver. A reef, uncovered at low water, extends 2 cables from the sandy south point of the cove, and a similar reef runs S.E. by E. nearly 3 cables from its north sandy point, with a rock always covered 2 cables S.W. from the south-east extreme of the reef. A salt creek runs into the south-west part of the cove; it has about 5 feet over the bar at its mouth at high water, and is navigable for boats for half a mile. There is a jetty with 7½ feet water at its outer end.

Ano or Salt Creek cove is also visited by small vessels for cargo and with stores, &c., but the neighbourhood is not inhabited.

Anchorage.—There is shelter for a small vessel in Salt Creek cove, with the wind between North and S.W., in 3½ fathoms sand; the extreme of cape Driver bearing S. by W. nearly 1½ miles, and the mouth of the creek W. by S. ½ S.

Water.—There is a well near the beach about half a mile North from the mouth of the creek.

TIDES:—It is high water, full and change, in Salt Creek cove at 3h. 30m.; springs rise 6 feet.

Aspect.—Off cape Driver, Elbow hill, 710 feet high, shows by itself on the extreme right to the N.E.; to the westward of it Triple hill is the first conspicuous summit; it is 928 feet high, 9 miles N.W. ¼ W. from Price point, and has three summits of nearly equal height. On a clear day, two ranges can be seen W.N.W. of Triple hill; the summit and most conspicuous part is a sharp peak 1,340 feet high, bearing N.W. by W., 16½ miles from Price point. To the south-west of these ranges the land is much lower, and there is nothing striking until mount Priscilla, a sharp cone about 800 feet high, which stands by itself directly inland from Salt Creek cove. Mount Priscilla is N.W. ½ W., 12 miles from cape Driver.

There is also a conical hill, and a range about one mile in length, to the southward of it, midway between mount Priscilla and cape Driver; these hills are all about 400 feet high. To the westward and south-west there is nothing remarkable except Mount hill, which may be seen if it is sufficiently clear. The land immediately behind the coast is composed of low rises covered with dense scrub, and is scarcely higher than the cliffs or coast sand-hills.

The COAST.—The north point of Salt Creek cove is N. ½ E. 2 miles from the pitch of cape Driver. From there a sandy bight extends N.E. ½ E. 1¾ miles; the coast, for 5½ miles, then becomes cliffy, with here and there a sand-hill; from the north extreme of the cliffs, a sandy beach, with low sand-hills behind, curves to the eastward for 3½ miles to Price point.

The highest part of the coast between cape Driver and Price point is a green hill, 147 feet high, close to the shore, one mile North from the southern extreme of the cliffs. A rock with less than one fathom water on it lies S. by W., half a mile from this hill; and a rock awash (situated at the south-east extreme of a reef extending W. by S. half a mile from it) lies South half a mile from the southern extreme of the cliffs. The reef has less than one fathom on it. A ledge of rocks extends half a mile off shore, at the junction of the cliff and the sandy beach west from Price point. At 4 miles north-eastward another ledge of rocks extends off shore for some distance. With there exceptions there are 5 fathoms anywhere at half a mile off shore between Salt Creek cove and Price point, and 10 fathoms 1½ miles from the coast.

PRICE POINT, N.E. ½ E. 12 miles from cape Driver, is a sandy point, 55 feet high, and surrounded to seaward by rocks which cover and uncover.

Anchorage.—There is anchorage for a small vessel, with westerly winds, in 3½ fathoms water, with the extreme of Price point, S.W. half a mile.

The COAST between Price point and a low rocky point N.E. by E. 3¾ miles from it forms a bay, in which the 5-fathoms line is half a mile off shore. The southern half of the coast line of the bay is low red sandy cliffs, and the northern half a sandy beach, backed by low sand-hills. From the low rocky point the sandy shore extends N.E. ¾ E. 7¼ miles to Germein point.

GERMEIN POINT, on the south side of the entrance to Franklin harbour is low, its extreme being composed of masses of weed, which shift about from time to time.

A spit runs S.E. ½ S. 1¼ miles from the point, with depths of from 1¾ to a quarter of a fathom over it. Between this spit and the shallow water extending 1¼ miles to the southward of Victoria point, is the channel over the bar into Franklin harbour.

VICTORIA POINT, on the north side of the entrance to Franklin harbour, is N.E. ¼ E. 1¼ miles from Germein point; its face is a red cliff 50 feet high, East, South, and West, 6 cables from the point, is a bank composed of sand and detached rocky ledges, which covers and uncovers. There is only three-quarters of a fathom S. by E. ¼ E. rather more than one mile from Victoria point, and 1½ fathoms S. ¾ E. 1¼ miles from it.

Aspect.—To the S.E. of Franklin harbour, and at about 5 miles from the entrance, the low hills connecting Elbow and Triple hills are seen on the extreme left to the S.W. Triple hill is not very conspicuous, as it stands far back. Elbow hill is the first remarkable one; it has a bold round summit. The next noticeable hill to the northward, is mount Parapet, 1,013 feet high; this hill has a very steep fall on its south-east side, which suggests its name.

Farther to the right, the range of which mount Olinthus is the summit, rising to the height of 1,446 feet, can be seen over the nearer hills.

Mount Olinthus and the hills of the same range are all sharp-topped.

On the nearer range to the right, is the Long-back hill, 1,038 feet high, which is one of the leading marks over the bar; the summit of this hill is at its south-west part, from which it slopes down suddenly on its south side, but it is nearly level for half a mile to the N.E.

Three miles further north is a peak 882 feet high, and 4 miles more in a north-easterly direction the range ends abruptly at N.E. peak, which is 861 feet high, and stands alone.

The hills mentioned are on the following bearings from Victoria point: Elbow hill, W. ¼ S. 9½ miles; mount Parapet, W. by N. ½ N. 9¾ miles; mount Olinthus, N.W. ¾ W. 18 miles; Long-back hill N.W. ¾ N. 11 miles; and the N.E. peak N. by W. 15 miles.

About Franklin harbour the red cliff of Victoria point and the trees above, are at once the highest and most conspicuous landmarks to recognise

Franklin harbour by; the cliff of the south part of Entrance island is next in height; and the rest of the coast, where it is seen, appears as a low bank covered with trees and shrubs.*

FRANKLIN HARBOUR, a good port for coasters, is a large sheet of shallow water half filled up by sand-banks which cover and uncover with the tide. The shores all round are very low, swampy, and fronted by mangroves. From Germein point, a sandy bank runs to the westward for half a mile to the mouth of Observatory creek; the observation spot is on the west side of the entrance to the creek. From there the shore trends N.W. half a mile (bordered by sand-hills about 20 feet high, for half that distance, and then by mangroves) to a mangrove point, which is one of the marks for entering the harbour. Two islands entirely surrounded by mangroves lie on the dry bank to the westward of this point.

From near the south-west point of the southern island the mainland extends in a bight S. by W. ¼ W. 1¼ miles to a mangrove point. The south end of Franklin harbour is 2 miles from this point, the coast between being mangroves and sandy beaches, with some detached clumps of mangroves lying a short distance from the beach.

With the exception of the low sandy bank on the sea beach, the land between the east shore of Franklin harbour and the sea is swampy, and nearly covered by a high tide. The edge of the bank which dries at low water is one cable off shore at Germein point, and continues the same distance to the mangrove point N.W. from Observatory creek; it then trends N.N.W. about one mile to a point, from which it turns sharply to the westward and south-west, running S.W. ½ W. 2½ miles to a sharp tongue named Howard spit.

From Howard spit the edge of the bank describes nearly a circle, 2 miles in diameter, and enclosing a pool with depths from 1½ to 2¼ fathoms in it, and drying generally to a distance of half a mile from the mangroves. To the west of Howard spit the channel into the pool is 3 cables wide, with 1½ to 2 fathoms.

It is possible that the south-west part of Franklin harbour may some day be used as a shipping place, the country inward from there abounding as it does in copper and iron.

From the south end of Franklin harbour the edge of the mangroves runs in a curve 4 miles to the northward to a point N. ½ E. 7 cables from the south extreme of Howard spit; the edge of the dry bank is 2 cables from the mangroves at this point. From there the mangrove shore trends in a northerly direction 4 miles to the north end of the harbour, with two slightly projecting points between. Along all the western shore the mangroves are fronted by rocks with sand outside.

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* *See* Admiralty plan, Franklin harbour, No. 785; scale, *m* = 2·0 inches.

The wool-shed of the Franklin harbour sheep station is close to the beach on the western shore, at a gap in the mangroves, near the north end of the harbour; it bears N.W. by N. from the south extreme of Entrance island. Steam vessels occasionally visit the harbour to load wool, &c., the produce of the sheep runs in its vicinity. The south extreme of a spit stretching off the northern shore bears E. ½ N., 6 cables from the wool shed.

S.E. 2½ miles from the north end of the harbour is a broad point facing the north point of Entrance island; the point has a hill on its western side. There is a shallow bight between this point and the wool-shed, scarcely any part of it having more than one fathom. The shore of the bight is generally fronted by mangroves, except in the N.E. part, where there is a bare sandy beach. From the point near Entrance island the coast bights to the northward, with very low swampy land behind, and then out to Victoria point.

A large portion of the northern part of Franklin harbour is occupied by a sand-bank, which dries in patches. Its south extreme is N.W. ½ W. 3½ cables from the south-west point of Entrance island; from there the bank extends N.N.W. 1¼ miles, and W.S.W. three-quarters of a mile, and is from 500 to 1,000 yards in width. The channel between the sand-bank and the bank running off the southern shore is 400 yards wide, with 2 to 4 fathoms water in it; it is narrowed to less than 200 yards for a quarter of a mile by a spit with 1¼ to 2 fathoms on it, which runs off the south extreme of the large sand-bank. The edge of the south bank in this part of the channel is very steep. The south extreme of the spit mentioned is W. ½ S. 2½ cables from the south-west point of Entrance island. Between the large bank and the western shore the channel is 2 to 4 cables wide, with from 1¼ to 1¾ fathoms water in it.

Between the large bank and Entrance island for the first half mile there are two channels; the one nearer the bank is one cable wide, with from 2 to 3 fathoms water in it; the other channel is from one to 3 cables wide, with 1¼ to 2 fathoms in it; N.E. and North of the bank, the deep water space is from 4 to 8 cables wide, with a depth of 1¼ to 2½ fathoms.*

The Bar is sand over rock; the sea generally breaks on it (except with winds off the land), more with a southerly wind than any other, but never dangerously. The shallowest part of the bar is on a bank, where there is 10 feet, lying South 1¾ miles from Victoria point. The extent of the bank is 200 yards N.W. and S.E., and 100 yards N.E. and S.W. Between this bank and the south-east extreme of the spit from Germein point the channel is 2 cables wide, with 2¼ fathoms least water. The channel between the bank and the spit from Victoria point is the same width, with 2 fathoms water.

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* A jetty 300 feet long with 6 feet water at its outer end has been erected.

Generally, the width of the channel between the two spits, over the shallowest part of the bar, is 6 cables; with not less than 10 feet at low water.

After crossing the bar, the channel between the spits narrows to 3 cables in width, and deepens to 3¼ to 3½ fathoms, but before passing Germein point shoals again to 2 fathoms.

Entrance Island, the centre of which is one mile to the westward of Victoria point, is 1¾ miles long N.N.E. and S.S.W., and from a quarter to half a mile wide.

It is divided into two islets at high water, the sea overflowing a portion in the middle, which is covered with mangroves. The north part has a general height of 25 feet, is covered with bushes, and bordered by mangroves and sandy banks, with rocks here and there which cover and uncover with the tide. There is a blind channel between the island and Victoria point which ends at the north extreme of the island.

The south part of the island is cliffy on its east side, the highest part of which is 32 feet above high water, and 5 cables from the south extreme of the island; from the top of the cliff the land slopes down to the mangroves which border the western shores.

The edge of the dry bank, which south of Entrance island is about 50 yards off shore, runs from there in an E. by N. direction for a quarter of a mile to a rock 400 yards in extent E.N.E. and W.S.W., and then extends to the northward parallel to the coast of the island.

A line of rock, the outer part of which is 100 yards from the shore, runs parallel to the whole of the south-west face of the island.

This island is infested with deaf adders of the most venomous description; a few quail and pigeons were also seen there, and some teal near Germein point.

Rock.—E. by N. 6 cables from the south extreme of Entrance island is a rock 200 yards in extent East and West, and 100 yards wide, uncovered at low water, and surrounded by a sandy bank, the edge of which is nowhere more than half a cable from the rock.

DIRECTIONS.—Franklin harbour is only available for vessels drawing less than 12 feet. The channel leading into deep water south of Franklin harbour, is marked by six buoys placed in position.

It should never be attempted at night, as the marks for entering cannot be clearly seen, and a vessel might easily get on shore before her position could be identified.

Approaching Franklin Harbour from the southward, keep more than 2 miles off shore until Victoria point bears North, which it should be brought to do when at least 3 miles distant. Then steer towards Victoria point, until the fairway red and black chequered buoy is observed (it is tub-shaped, surmounted by staff and ball, and moored on the edge of the 1¾ fathoms patch, South 1¾ miles from Victoria point), and leave it on the starboard hand, when a course of N.N.W. ½ W. will lead half-way between two buoys about half a mile distant from the chequered buoy, one red on the starboard hand, the other black on the port hand; when near them, the remaining buoys marking the channel into deep water south of Entrance island will easily be recognised, rounding the south point of the island at the distance of one cable.

From the northward and eastward, in making Franklin harbour the coast should not be approached within 3 miles, or the water shoaled to less than 5 fathoms, until after Victoria point bears North; then proceed as before.

A vessel may anchor in 4 fathoms water with the south extreme of Entrance island bearing East, and the mouth of Observatory creek S. by E.

If going up to the wool-shed anchorage, after passing Entrance island, when the mouth of Observatory creek bears South, bring the north extreme of the bushes on Germein point nearly in line with the south extreme of Entrance island S.E. by E. ¼ E., this leads in 2¼ fathoms over the spit off the south extreme of the large sand-bank; with the extreme of Germein point in line with the south extreme of Entrance island, a vessel will pass over 1¼ fathoms, so the point must be kept open. Keep the former marks on until well into the channel between the two sand-banks, the edges of which show very clearly except near the time of high water. There will be no more difficulty until rounding the spit to turn to the northward along the western shore; the turn is so sharp and the channel is so narrow that great care is required there, or a vessel will ground on the bank of the western shore. After rounding the spit keep about half a mile off the mangroves on the western shore, and anchor with the wool-shed bearing W.N.W. 6 to 7 cables distant, in 1¾ fathoms, mud.

If bound to the south-west part of the harbour, after leaving the large detached sand-bank on the starboard hand, the deepest water will be found on the east side of the channel up to Howard spit, not more than a cable from the edge of the eastern bank. A spit with 3 feet on it extends W.S.W. 600 yards from the dry south-west extreme of Howard spit. The shallowest part of the channel is at the entrance to the pool, where there are not more than 8 feet at low water. A vessel may anchor in 9 feet, with

Elbow hill over the left extreme of a series of small sandy beaches on the western shore W. by N., and the right extreme of the mangroves on the western shore N.E. ½ N.

In working in or out over the bar, a vessel should be conned from the masthead, and a close attention be paid to the lead, the tide, and the chart.

TIDES.—It is high water, full and change, at Franklin harbour entrance at 4 h.; springs rise 5 feet 6 inches. The ebb and flood streams make a few minutes after high and low water respectively. A long continuance of south-westerly and southerly winds raise the general level of the water in Franklin harbour 2 to 3 feet; the tidal streams are then very strong, the ebb running as much as 5 knots an hour off Germein point. At ordinary springs it runs there, and in the narrow channels up the harbour, 3 knots at its strength.

Seaward of Franklin harbour, at 4 miles S.S.E. of Germein point, the flood runs N.E. by E. and the ebb S.W. by W., each 2 knots an hour; 5 miles East of the same point, the flood E. by N. ½ N. and the ebb W. by S. ½ S., each 1½ knots; and at 3 miles S.E. of Shoalwater point, the flood runs N.E. and the ebb S.W., each 2 knots an hour.

The COAST.—From Victoria point the shore describes a convex curve N.E. by E. ½ E. 3½ miles to a sand-hill at the entrance to a swamp. The land between is very low with the exception of one wooded rise. S.E. by S., nearly 1½ miles from the sand-hill is a small dry bank, 200 yards in extent, with 3 feet water half a mile W.S.W. of it, and the same depth 3 cables W.N.W. There is one fathom water between the bank and the coast, and only 2 fathoms at 4 cables South of the bank. From the sand-hill mentioned, the direction taken by the coast is E. by N. ½ N. 6 miles to a very low point and then N.E. ½ E. 2½ miles to Shoalwater point. At 3½ miles along the coast from the sand-hill are three wooded rises, each about 40 feet high; off them, the edge of the dry bank is rather more than one mile from the beach.

From Victoria point to 4 miles to the eastward, the edge of the 5-fathoms bank is 2 miles off shore, and thence to Shoalwater point from 3 to 3½ miles off.

SHOALWATER POINT bears E.N.E. 11¾ miles from Victoria point, the coast between projecting nearly a mile beyond the line joining the two points.

Shoalwater point is not more than 10 feet high, the land behind being swampy up to the foot of the range, 15 miles in-shore. The dry bank extends to a distance of 1½ miles in a S.E. direction from the point; and S.E. ¾ S. about 2 miles from Shoalwater point there is a bank with only

2 feet water on it, one fathom in-shore of it, and 4 fathoms one mile to the S.E.

Anchorage.—To the N.E. of Shoalwater point there is good anchorage anywhere on the bank off shore, in from 2 to 5 fathoms. The water is always smooth and the holding ground good.

The COAST.—From Shoalwater point it is N.N.E. easterly 15 miles to Plank point, the coast between being nearly straight, and in no part elevated more than 20 feet. A sandy bank extends on the average one mile from the beach; there is generally a depth of 5 fathoms 3 miles from the edge of the bank. There are only 2¾ fathoms S.E. ½ S. 3 miles from Plank point.

PLANK POINT,* nearly N.E. by E. 32 miles from Elbow hill, may be easily known by three sand-hills along the coast, the point being close to the northernmost; the southernmost and most conspicuous hill is 56 feet high, and is the most elevated part of the coast between Franklin harbour and mount Young, to the north-eastward.

The COAST.—From Plank point the coast takes a general N. by E. ½ E. direction, 21 miles to the foot of mount Young, and forms a shallow bay immediately to the southward of the mount. The shore consists either of beach or mangrove bushes, fronted the whole distance by shoal water, extending in some parts about 2 miles from the shore, the water shoaling quickly from 7 and 8 to 2 and 3 fathoms.

TIDES.—It is high water, full and change, at Plank point, at about 6h. 15m.; springs rise 6 to 8 feet.

MOUNT YOUNG, which is the most prominent feature of this part of the western coast of Spencer gulf, bears N. by E. ½ E. distant 22 miles from Plank point; it rises steeply to the height of 475 feet, from the low land on all sides of it. This hill, which, when seen from a distance, makes out as a double peak, is situated 1½ miles from the nearest part of the mangrove coast; the intermediate space being mostly occupied by swamps, which extend along the coast to Hummock hill, 6 miles to the north-eastward, and as far to the southward as the eye could trace. The country inland of mount Young is an extensive plain, gradually rising to the westward and covered with stunted scrub.

Middle-back Mount, nearly W. by S. ½ S. 19 miles from mount Young, is 1,519 feet high, and is the summit of ranges of hills extending from about 10 miles westward of Plank point to 18 miles W. by N. ½ N. of mount Young; but they are too distant to be of any great service to passing vessels. Between this range and the shore there are other ranges of hills of less elevation, besides those already noticed.

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* *See* Admiralty charts, South Australia, Riley point to Woods point, and Woods point to Lowly point, Nos. 404 and 403; scale, m = 1·0 inch.

Four Fathoms Shoal, about half a mile in diameter, with mount Young bearing N.W. ¾ N., and Hummock hill N. by W., is marked by a cheese shaped buoy chequered red and black, and surmounted by a globe on a pyramidal frame. The buoy is moored in 4 fathoms.

WESTERN SHOAL lies 2 miles from the shore in the shallow bight immediately to the southward of mount Young, with a sandy patch about half a mile in extent which dries; and from this patch the shallow part of Western shoal extends in an East and E.N.E. direction 3 miles in length, and about half a mile in breadth, with not more than 3 feet on it at low water, but having a 2-fathoms channel between it and the sand-patch fronting the shore. The 5-fathoms edge of Western shoal extends about 3½ miles south-eastward from the sandy patch, and then sweeps round northward to about 2 miles off Hummock hill, there being 3 fathoms on the outer edge at E. by S. ¾ S. 6 miles from mount Young; and S. by E. 6¾ miles from Hummock hill.

Anchorage.—In the bay southward of mount Young there is anchorage in from 12 to 15 feet water, to the south-west of the patch which dries on the west end of Western shoal, at about three-quarters of a mile from the shore, with mount Young bearing N. ½ E.

DIRECTIONS.—After sighting mount Young, which may be seen from the parallel of Plank point, the shoal water fronting the western coast in the vicinity of the point will be cleared by keeping the mount to the westward of North, until Hummock hill is distinguished, when by keeping it to the westward of North, the Western shoal will be cleared to the eastward in 3 fathoms.

The COAST from 1½ miles southward of mount Young trends N.E. ¾ N. 7½ miles to Hummock hill point; it is very low and swampy for some distance inland, and has a fringe of mangrove bushes along shore, with sand-flats, which dry at low water springs, at half a mile to one mile off shore.

Hummock Hill, N.E. ¼ E. 6½ miles from mount Young, is round and grassy, and rises from a point of the coast to the height of 201 feet above high water. The point has a shingle beach, with sand-flats extending 100 yards off it, and 4 fathoms at half a mile from the shore.

Mount Laura, N. by E. ¼ E. 6½ miles from mount Young, is situated on a ridge extending north-westward from Hummock hill, and rises to the height of 596 feet; it is a sharp wedge-shaped hill, with its west face nearly perpendicular.

FALSE BAY extends from Hummock hill point N.E. by E. ¼ E. 7 miles to Black point, and is 3½ miles deep, with 4 or 5 fathoms in the centre, and the water gradually decreasing in depth towards the head of the bay. Black point, however, is nearly steep-to, with 4 or 5 fathoms at 2 cables off shore. The shore of False bay is fronted by a sand-flat, which dries at low water, and extends, in some places, more than a mile off shore. *See* Ballast, p. 164.

Anchorage.—The bay affords good anchorage, with northerly and westerly winds.

Caution.—The land at the head of False bay is very low and swampy, and continues so for many miles inland, so that to vessels running up Spencer gulf, the bay presents the appearance of an opening which has sometimes been mistaken for the entrance of port Augusta, before the entrance of the head of the gulf makes out.

TIDES.—It is high water full and change, in False bay, at 7 h.; springs rise 6 to 8 feet. At half a mile off Black point, in 5 fathoms water, the flood sets East and the ebb West about one knot; at about half a mile off Hummock point the streams set North and South.

Black Point, the north-eastern extreme of False bay, is formed of a limestone cliff about 50 feet high, and, although the cliff is of a light colour, its overhanging face, having a southern aspect, is nearly always in shadow and appears black.

From black point the coast trends E. ¼ S. 3 miles to Lowly point, and is bordered by a rocky ledge extending 300 yards from high-water mark. There is a patch with 4¼ fathoms water on it, at about one mile off shore, midway between Black point and Lowly point, with 10 fathoms between the patch and the latter point.

FAIRWAY BANK, on which the least water is 4 fathoms, lies nearly in mid-channel off False bay, with its north-eastern end S.W. ½ S. 4 miles from Lowly point; it is 3 miles long, N.N.E. ½ E. and S.S.W. ½ W., and three-quarters of a mile broad. Mount Laura and Hummock hill in line, bearing N.W by W. ½ W. just clear the south-west end of this bank in 5½ fathoms. There is a safe channel, 3 miles wide, with 6 to 10 fathoms water in it, between Fairway bank and the shoal water of False bay.

EASTERN COAST of Spencer Gulf.[*]—The western coast having been described from cape Catastrophe to Lowly point, where the gulf is only 8½ miles wide, the navigator's attention will be next directed to the eastern coast, before proceeding farther up the gulf to port Augusta.

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[*] *See* Admiralty charts of St. Vincent and Spencer gulfs, No. 2,389 a and b; scale, m = 0·18 of an inch.

YORKE PENINSULA, at one time looked on as only fit for pastoral purposes, has lately been settled in many places by farmers, and a large quantity of wheat is now grown.

CAPE SPENCER, in lat. 35° 18′ 21″ S., long. 136° 53′ E., is the southernmost of three cliffy points with sand-hillocks behind them, forming the south-west extreme of Yorke peninsula; it is 258 feet high, with a ledge of rocks at its base, and from the southward appears like a cone.

Reef head, W.N.W. 2 miles from cape Spencer, has a reef extending S.S.W. ½ W. 4 cables from it.

West Cape, the westernmost point of Yorke peninsula, bearing N.W. by N. 2½ miles from Reef head, is 190 feet high.

ALTHORPE ISLES are three in number, the centre of the southernmost and largest, lies S. by W. 4½ miles from cape Spencer, and N.N.E. ¾ E. 26½ miles from cape Borda; it is 2 miles in circumference, nearly flat-topped, and 305 feet high, with steep sides and a cleft across its southern part, visible from eastward and westward. Dry rocks lie a quarter of a mile West of the south point, and some larger ones half a mile from the west side of the island. A rock, upon which the sea breaks, lies N.W. half a mile from the island, with 9 fathoms between them. The summit of the island is much burrowed by mutton birds and penguins. The south extreme of the island, after passing the rocks west of it, may be rounded within a mile in 20 fathoms; but when close in, the wind is generally baffling from the westward.

Anchorage.—There is anchorage in 8 to 10 fathoms water, on a sandy bottom, sheltered from westerly gales, off a remarkable yellow overhanging cliff, on the east side of the island, with its extremes bearing N.N.W. and South; and in fine weather, landing may be effected upon the sandy beach or the rocks on the north-east side, and in a small cove on the south-east side of the island.

The other two Althorpe isles are bare rocks, lying S.E. 1¾ miles, and S.E. ½ S. 3 miles from cape Spencer, the former being 131, and the latter 102 feet high. A sunken rock upon which the sea generally breaks, lies N.N.W. 3 cables length from the southernmost of the two islets.

LIGHT.—A lighthouse, 40 feet high and painted white, has been erected on the southern Althorpe island.

The light is a *flashing* white light of the first order, showing a flash every *fifteen seconds*, elevated 350 feet above the sea. A sector of *red* light is shown between the bearings S. 28¾° E. (this bearing leads half a mile eastward of Emmes reef), and S. 64¾° E. (this bearing leads nearly half a mile southward of S.W. rock).

The bright portion of the light should be visible in clear weather from a distance of 25 miles; the red light, 17 miles. In ordinary weather, the bright portion of the light is visible over the low land of the south-west extreme of Yorke peninsula, between the following bearings, viz.:—

Between S. by E. ¼ E. and S. ¾ E.; and between S. ½ E. and S. ½ W.

EMMES REEF, W. by S. ¼ S. 3¼ miles from cape Spencer, is a rocky patch 50 yards across, that dries 5 feet at low water springs, and upon which the sea at other times breaks heavily; there are 17 fathoms at a quarter of a mile from the reef.

Breakers.—The Commander of the *Governor Musgrave* has reported the existence of heavy breakers about 2¾ miles off the south-west point of Yorke peninsula, bearing W. by N., distant about one mile from Emmes reef. At the time the breakers were seen, a moderate south-west gale was blowing, with a high sea.

This bearing and distance places the danger in lat. 35° 18′ 40″ S., long. 136° 47′ 30″ E.

S.W. ROCK, upon which the sea only breaks at intervals during a heavy swell, or in a westerly gale, lies N.W. by W. 3¼ miles from the centre of the largest Althorpe isle.

TIDES.—At South Althorpe isle the flood sets N.W., and the ebb South.

Soundings.—There are 35 to 45 fathoms at 8 or 9 miles to the westward and southward of the largest Althorpe isle, and 22 fathoms at 6 miles to the eastward of it. From cape Spencer to the Foul ground south-eastward of Gambier isles there are 20 to 35 fathoms.

PONDALOWIE BAY, so called by the natives, is the northern of two small bays between West cape and Royston head. From Royston head Pondalowie bay extends 2½ miles to its southern bight, its eastern shore being a sandy beach backed by high sand-hills. A reef of sunken rocks, upon which the sea breaks in south-west gales, projects from a cliffy head just outside of the south point of Pondalowie bay, to three-quarters of a mile N.N.W. of West cape.

The entrance of Pondalowie bay, which is nearly three-quarters of a mile wide, with 6 fathoms water, lies between the South and Middle islets; the former islet is small, and connected at low water with the south point of the bay; and the latter, which lies to the northward of South islet, and S. by W. ½ W. 1¼ miles from the North islet, close off Royston head, is half a mile long, W.N.W. and E.S.E., and is 94 feet high, with a reef of dry and covered rocks projecting W.N.W. 800 yards from its western point, and a reef of sunken rocks extending 200 yards from the middle of its uth side. A rock, with 7 feet water on it, upon which the sea breaks at intervals in south-west gales, lies close within the entrance, with the outer extreme of the South islet bearing S.W. ½ S., distant 3½ cables, and the highest sand-hill on the beach S.E. by E. ½ E. The channel between the Middle islet and the shore is rocky, with only 2 fathoms water in it.

The three islets fronting Pondalowie bay, which are the Black rocks of Flinders, being of a dark-coloured limestone on their western aspect, appear in the forenoon quite black when seen from seaward against the sand-hills on the shore.

Directions.—Vessels approaching Pondalowie bay from the southward, should keep the cliffs of Reef head open to the south-westward of West cape, bearing S.E. ½ S., to clear the reef which projects N.N.W. from the cape. And any small vessel entering the bay between South and Middle islets should, to avoid the sunken rock in it, and the reef on the south side of Middle isle, run in with the high sand-hill just open to the northward of the South islet bearing E. by S., passing the islet, which is steep-to, within a cable's length.

Pondalowie bay would afford good shelter in 3½ fathoms for a small vessel, with any winds from North round by east to W.S.W., at a quarter of a mile off shore, but there is no good holding-ground, the bottom being smooth limestone with a thin covering of sand.

ROYSTON HEAD, a cliffy point 195 feet high, bearing N. by E. ½ E. distant 3 miles from West cape. North islet, a steep rocky islet, 80 feet high, lies close off the head, with which it is connected by a reef.

DALY HEAD is steep and rocky, with a grassy summit 207 feet high ; a reef, partly dry 4 feet above water, projects half a mile westward from the head. The country behind Daly head, to the northward, is low, with several salt swamps and small grassy plains, with some wells of good water within the hills. This part of Yorke peninsula is occupied during the summer months by sheep stations.

The COAST.—From Royston head a succession of small sandy beaches and rocky points extends N.E. by N. 8 miles to the bight of a bay, and from thence a sandy beach trends N.W. by N. 4 miles to Daly head, which bears N. by E. ½ E., distant 10½ miles from Royston head. The whole of the coast between the two heads is backed by high sand-hills, and the points have generally rocks extending 200 to 400 yards from them.

A rock upon which the sea breaks heavily, except in very fine weather, and with easterly winds, lies N.N.E. ¾ E. 3½ miles from Royston head, at a little more than a mile from the shore.

From Daly head the coast curves slightly N. by E. ¼ E. 6¼ miles to the southern point of a sandy bay, which extends from thence N.N.E. ¼ E. 3¼ miles to Corny point. Two reefs project one-third of a mile from a rocky point at one mile N.E. ¾ N. of Daly head, and there are several rocks within a quarter of a mile of the beach to the northward. At N.N.E. 4 miles from Daly head is a rocky point, off which are two detached rocks, always above water, the outer one being three-quarters of a mile off shore. The coast between Daly head and Corny point is generally sandy, and from immediately to the northward of the head, a range of high sand-hills extends along the beach.

WEBB ROCK, on which the barque *Tomatin* struck, lies N. by W. 3¼ miles from Daly head, and S.W. ½ S. 6½ miles from Corny point; it has generally heavy breakers upon it, but during the summer months, after long-continued easterly winds, the sea only breaks slightly on it at intervals. A knob of the outer part of the rock is awash at low-water, springs. It is proposed to blow up this rock.

CORNY POINT, the south-west point of Hardwicke bay, is a double sloping rocky projection, in lat. 34° 54′ 3″ S., long. 137° 1′ E.; the coast to the southward is higher than the point itself; but to the northward it is low and sandy, the only dangers about the point being some rocks above water to the south-westward, which do not extend beyond a quarter of a mile from the shore.

LIGHT.—From the lighthouse erected on Corny point, is exhibited a *fixed* white light of the third order, visible seaward through an arc of 200°, or between the bearings of N. 45° E. and S. 65° W.; it is elevated 98 feet above the sea, and visible in clear weather from a distance of 14 miles. The lighthouse, keepers' dwellings, and store room are painted white.

An arc of reflected light from the lighthouse is visible inshore of Webb rock, and unless the night be clear and the land in sight, might (in the absence of bearings) be mistaken for the true light.

Vessels approaching from the southward, should not bring Corny point lighthouse to bear to the northward of N.E. ½ E., until past Webb rock.

The reflected light may, in clear weather, be seen from a distance of about 10 miles, inside the bearing of N.E. ¾ N.—This inner passage should never be attempted at night by a sailing vessel, unless with a fair wind and thorough knowledge of the coast.

Directions.—Corny point may be safely rounded within half a mile, in 9 to 10 fathoms water, the only dangers about it being the rocks which project a quarter of a mile to the south-westward from it. But after rounding the point into Hardwicke bay, a vessel should keep farther from the shore, as the water quickly shoals when within Corny point, and for the first 2 miles, a large vessel should not bring the point to the westward of W.S.W.

HARDWICKE BAY extends from Corny point N.E. by N. 28 miles to the south point of Wardang isle, and is 18 miles deep, expanding Spencer gulf to the width of 72 miles.

From Corny point, the southern shore of Hardwicke bay, which consists of a sandy beach, backed by gently rising woody land, curves eastward 12½ miles to Souttar point, on which is a sand-hill, partly white and 85 feet high. At 4 miles eastward of Corny point are some shepherds' huts, and a well of good water at half a mile from the beach. There is anchorage in 4½ fathoms water North of the huts, with Corny point bearing W. by S. ½ S.

A spit with 6 to 18 feet water on it, projects 3 miles northward from a low sandy point at 4 miles westward of Souttar point, having as little as 9 feet on it at 2½ miles from the shore. From this spit a 4-fathoms bank extends 6 miles to the north-eastward. There is good shelter with smooth water, in 3½ fathoms, between the spit and Souttar point, at half a mile from the beach. From Souttar point the coast trends E. by S. one mile, and then curves round to Turton point, a cliffy projection at E.S.E. 4½ miles from Souttar point. There are 3 to 4 fathoms water at half a mile from the shore, which consists of small stony beaches and low limestone cliffs.

From Turton point a sandy beach, forming the bight of Hardwicke bay, curves round 5 miles in an E.N.E. direction, with low sandy land extending between two wooded ranges, in a S.S.E. direction, and forming the narrowest part of Yorke peninsula, which is there only 9 miles across. Mount Gore, S. ½ E. 5½ miles from Souttar point, is 326 feet high. From the bight of Hardwicke bay the eastern shore extends 26 miles northward to Gawler point, and consists of sandy beaches and low rocky points, with a coast range of sand-hills, behind which the country gradually rises to the height of 400 feet at about 5 miles inland.

Soundings.—The general depth of water in Hardwicke bay is 8 to 12 fathoms; there are, however, some rocky patches, with only 6 to 7 fathoms in the middle of the bay, between which and Corny point there are 16 to 6 fathoms. In the northern part of the bay there are 7 to 9 fathoms, between 3 and 5 miles off shore: and between 5 and 10 miles south-westward of Wardang isle there are very irregular soundings in 10 to 6 and 16 fathoms, on a sandy bottom.

General Directions.—In approaching any of the ports in Hardwicke bay at night a vessel should anchor immediately on shoaling her waters to less than 5 fathoms, unless it is light enough to clearly identify her position when the most convenient berth may be sought. As a general rule, 5 fathoms will place a vessel within one mile of the shore, but in some parts off ports Victoria and Turton point much nearer, and it will clear all dangers.

In working to windward in Hardwicke bay the east coast may be approached as near as one mile, or into 5 fathoms, and a vessel should stand off about 6 or 7 miles before tacking in-shore. There is less tidal stream near the shore than out towards Spencer gulf. Although there is comparatively shallow water in Hardwicke bay, the bottom is so rocky that it has not much effect in breaking the sea in a westerly gale.

Anchorages.—Vessels may anchor in many parts of Hardwicke bay, sheltered from all southerly winds, which are the only ones that seem to blow with much strength. The best anchorages appear to be those off the huts eastward of Corny point; and between Souttar point and the spit to the westward of it, where there is soft good holding ground.

The bottom at all the ports in Hardwicke bay is rocky, with a good scope of cable a vessel will, however, ride safely.

Fish.—There is good fishing ground for schnapper off Corny point, and mackerel abound in the bay.

TIDES.—It is high water, full and change, all over Hardwicke bay, at 2 h. 30 m.; springs rise 6 feet. The flood stream sets to the northward, and the ebb to the southward, following the direction of the coast.

Port Turton is situated just eastward of Turton point. The bottom of this port is so rocky that a broken sea gets up very quickly, and as quickly goes down when the wind does. A jetty extends from the south-east side of Turton point for 300 feet in a north-easterly direction, with 7½ feet water at its outer end on both sides. Several rocks, with from 2 to 4 feet water on them, lie off either side and its extremity. The north side of the jetty is available for one small vessel drawing 4 feet, and the south side for one drawing 6 feet, if not more than 100 feet long. With a North or N.W. wind a vessel could not lie on the north side of the jetty, or if it blew strong from those quarters on the south side. Sailing vessels using the jetty should be prepared to haul off and anchor without delay.

Directions.—From the northward; when one mile S.W. of the south point of Wardang island, the course is S. ½ E. 23½ miles to near Turton jetty. From the southward; when one mile N.W. of Corny point a large vessel should steer N.E. by E. ½ E., 16 miles, keeping Corny point bear-southward of S.W. by W. until mount Gore bears South, then steer S.S.E. ½ E. 11 miles for Turton jetty. Vessels not requiring more than 15 feet water, may from the above position off Corny point shape a course E.N.E. for 10½ miles, or until mount Gore bears S.S.E.: keeping Corny point bearing southward of S.W. by W. ½ W. until then. From there steer S.E. by E. 10 miles for Turton jetty.

Vessels may with a fair wind cross the shoals in 10 feet least water, by keeping the extreme of Corny point bearing W. ½ S. until abreast the west part of Souttar point, or keeping just southward of the line joining Corny and Souttar points. Keep half a mile off Souttar point, in rounding at the west part of Turton point the 3-fathoms line is only one cable off from high-water mark, north of the jetty it is 2 cables off, and as the shore bights to the southward it increases its distance, being one mile off shore at less than a mile to the eastward of the jetty.

Anchorage.—A large vessel may anchor in 21 to 23 feet water, with the jetty bearing S.W. distant 3 cables, and a small vessel with the jetty in line bearing S.W. by W., 1½ cables distant, in 12 to 16 feet water.

Port Minlacowie.—About Minlacowie the shore is backed by low sand-hills 20 to 40 feet high, covered with bushes and shea oaks, and fronted by a ledge of rocks which dry to about 1½ cables from high-water mark. The jetty is N.E. ½ N. 8 miles from Turton point, and 7 miles to the southward of Brown point. It extends west 1,155 feet from high-water mark, and has from 13 to 14 feet water at its outer end, with from 9 to 10 feet water at 150 feet in; the low-water mark being about 700 feet from the end. Several dangerous rocks, with from 2 to 11 feet water on them, lie in different directions at from one third to 2½ cables off the jetty.

To the northward and southward of Minlacowie jetty the 3-fathoms line is, on the average, half a mile off shore. There are no dangers outside the 3-fathoms line, the depth rapidly increasing to 5 fathoms at one mile from the coast.

Directions.—From the northward; from one mile S.W. of the south point of Wardang island, the course is S.S.E. 19 miles. From the southward; when one mile N.W. of Corny point large vessels should steer N.E. by E. ½ E. 16 miles, and not bring Corny point to bear west of S.W. by W. until mount Gore bears South, thence the course and distance to Minlacowie is E.S.E. 10 miles. For vessels not requiring more than 15 feet water, from the position off Corny point, steer E.N.E. 10½ miles, taking care not to bring Corny point to bear westward of S.W. by W. ½ W. until mount Gore bears southward of S.S.E. Then steer E. ¼ N. 12½ miles to Minlacowie.

Anchorage.—A vessel of 18 feet draught may anchor in 20 to 22 feet water, with the jetty bearing E.S.E. 3 cables distant; at 3 cables farther out on the same bearing there are 24 to 26 feet water. A vessel drawing more than 10 feet can only approach the jetty by keeping its outer end bearing S.E. by E. ½ E., and 10 feet is the greatest draught of vessel that can be altogether alongside of the jetty. A vessel of more than 8 feet draught should not bring the outer end of the jetty to bear south of S.E. or north of N.E. while within half a mile of the shore, to void the 9 feet rocks. Any sailing vessel going alongside the jetty should let go an anchor to ride to, in case it becomes too rough to lie alongside.

Port Rickaby is off a sandy beach 10 miles S. by E. of Gawler point. The length of beach clear of fronting rocks is nearly 4 cables in extent. To the northward there are rocks which cover and uncover, projecting 4 cables off from high-water mark, at half a mile N. ½ W. from the north end of the beach. The high-water line at the back of the beach runs N. by W. and S. by E. with two bare sand-hills behind, the northern 58 and the southern 55 feet high. From the south end of the beach the coast runs S.S.W. 8 cables to a rocky point, with rocks which dry at low-water stretching one cable off it. The outer extreme of the rocks with 10 feet water on it, and 20 to 22 feet close to outside, is 2½ cables west of the point. South of the southern beach sand-hill there is a gap through which Rickaby's house is visible from the westward; sand-hills then commence again, one being 69 feet high with shea oaks on the top, at half a mile to the southward of the beach. The jetty is 405 feet long, with 8½ feet at its outer end at low water. It is proposed to extend it to have 12 feet water.

A strong sea breeze causes enough run on Rickaby beach, to make care necessary in landing.

Soundings.—Off the clear beach the general 3-fathoms line is only 1½ cables distant. Several rocky patches, with 16 to 18 feet water on them, lie farther out, the most distant being nearly 4 cables west from the centre of the beach. The bottom is very irregular farther out, but there is nothing less than 20 feet, and 5 fathoms at one mile off shore.

Directions.—From one mile South of Wardang island the course is S.E. ½ E. 10 miles. From the southward, at one mile N.W. of Corny point the course is N.E. by E. ½ E. 27½ miles, but a vessel must not stand to the eastward so far as to bring Corny point to the westward of S.W. by W. until mount Gore (which is the highest land to the southward of Turton point), bears South, to avoid the shoal ground in the south part of Hardwicke bay. A large vessel should anchor three-quarters of a mile off shore, with the southern beach sand-hill (on which there is a pole), bearing East, in 4 to 4½ fathoms. A small vessel with the sand-hill on the same bearing, 2 cables off shore, in 3½ fathoms. To clear all dangers a vessel should not come within a mile of the coast, until the southern beach sand-hill bears between E.N.E. and S.E. A westerly gale might oblige a vessel to slip her cable, she should, therefore, have room to get underway.

GAWLER POINT.—Gawler point is low, sloping and grassy, from whence port Victoria extends N. by W. 4 miles, and from the entrance runs in 3½ miles to the low land to the northward. Rocks which cover and uncover stretch from Gawler point 3¼ cables towards Eclipse rock, with 16 to 20 feet between.

WARDANG ISLE, the south point of which lies W. by S. ¼ S. 6 miles from Gawler point, is 4 miles long, North and South, 2 miles broad, and rises to a grassy surface 107 feet high towards its west side, which consists of a succession of small sandy beaches and rocky points, with sand-hills towards the north end of the island, where there are some remarkable cliffy points.

With the exception of a red cliff 50 feet high within a mile of the north point of Wardang isle, its eastern side forms a continuous sandy beach, Bird point being half way between the north and south extremes. From Bird point, a sandy spit, intersected by three narrow boat channels, stretches 3½ miles in an E.N.E. direction into port Victoria. These channels are liable to change in position and depth. On the north side of this spit, at 2¼ miles from Bird point, and South three-quarters of a mile from the north-west point of port Victoria, is a rocky islet. Between Rocky islet and the north-western point of port Victoria, is a channel half a mile wide, with 6 to 9 feet water, leading into port Victoria.*

Goose Islet, which is small and grassy, lies 4 cables off the north point of Wardang isle, with which it is connected at low water. Two small dry rocks lie 2 cables to the northward of the islet.

ISLAND POINT, which forms the north-east side of the northern entrance of port Victoria, is a low grassy projection at N.E. 2½ miles from Wardang isle, with a small islet 20 feet high, lying close off it, the islet being connected with the point at low water.

Dangers.—Beatrice rock, N. by W. 7 cables from Island point, has a small portion which dries 2 feet at low water; but it does not show at high water.

Another small rock, which dries 3 feet at low water, springs, lies W. by S. ¼ S. nearly one mile from Island point, and from its position near the entrance, is dangerous to vessels working into port Victoria.

North Entrance to Port Victoria, which lies between Wardang isle and Island point, is protected from the southward by the long sandy spit which projects E.N.E. from the east side of the island. Green islet, which lies E.N.E. 1½ miles from the red cliff on the north-east extreme of Wardang isle, is connected at low water with the eastern shore of the port. This harbour affords anchorage in 3½ to 4 fathoms, with good holding ground of ooze, well sheltered from all winds except those from between North and N.W.

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* *See* Admiralty plan, port Victoria, No. 752; scale, $m = 2{\cdot}0$ inches.

Directions.—In running in from the westward, the rocks which lie to the northward of Goose islet may be rounded in 4 and 5 fathoms, at the distance of a cable; but if it be necessary to make a tack outside Green islet, a vessel should go round before the Rocky islet on the spit comes in line with Green islet, or when the latter islet bears S.E.

Anchorage.—The best anchorage, recommended for large vessels, is in 4½ fathoms water, sand and mud, with Goose islet bearing West, and the east extreme of Wardang isle South; but smaller vessels may anchor farther in to the southward.

PORT VICTORIA.—The bay to the N.W. of Gawler point is now called port Victoria. The water in the bay is shallow, but there are from 3½ to 5 fathoms, sand, at 1½ miles to the N.N.W. and West of Gawler point, with shelter from all winds except those from between W.S.W. and South; the holding ground is not good, and north-west and westerly gales almost invariably terminate with a gale from S.W., which would make this a dangerous anchorage.

The jetty is three-quarters of a mile North of Gawler point, and runs N.W. by W. ½ W. 950 feet from high-water mark, with 9½ feet water at its outer end and 6 feet at 450 feet in, the low-water mark being 700 feet from its outer end. There is a crane on the jetty. With a fresh S.W. wind (the prevailing sea breeze), a vessel could not lie on the south side. There is a telegraph station here. The main street of Wauraltee (the township) is in line with the jetty.

Eclipse Rock lies W. by S. ¼ S. 2¾ cables from the outer end of the jetty, and N. ¼ W. 7 cables from the north part of Gawler point. Its extent, with 6 feet water, is 70 yards East and West, and 100 yards North and South, and double those distances with less than 12 feet. Midway to the jetty there are only 8 feet water.

A red buoy, with staff and ball, lies at the south end of the shallow part. The light at the jetty end shows directly over Eclipse rock.

LIGHT.—A *fixed* white light is shown from the end of the jetty, and is visible 5 miles.

Directions.—From one mile South of Wardang island steer N.E. by E. 7 miles to port Victoria, taking care not to bring the extreme of the rocks off the south point of Wardang island to bear to the southward of S.W. by W. to avoid the shoals between the island and port Victoria. From one mile N.W. of Corny point to port Victoria jetty the course is N.E. ½ N. 33½ miles. Gawler point is steep to, there being 3 fathoms less than a cable off. The buoy on Eclipse rock should not be approached nearer than a cable; to clear this rock and the rocks north of Gawler point, the extreme of the point should not be brought to bear southward of S. by E. until the outer end of the jetty bears south of east when the jetty may be steered for.

Anchorage.—Vessels of 18 feet draught may anchor in 21 to 23 feet water, with the jetty end bearing S.E. ½ E. distant half a mile. If of more draught, with the jetty end bearing East, three-quarters of a mile in 26 to 27 feet. Small vessels unable to go alongside the jetty should anchor in 10 or 12 feet water with the jetty end S.S.E. distant 1½ cables.

TIDES.—It is high water, full and change, in port Victoria, at 2 h. 40 m.; springs rise 5 feet. The tide stream sets North and South, the flood about 1½ knots to the northward.

REEF POINT, N.N.E. 3 miles from Island point, is low, with a reddish cliff or bank on its west side, and a remarkable white sand-patch at 4 cables to the southward of it. Ledges of rocks, which dry, extend about 400 yards to the westward and a quarter of a mile to the northward from the point, with a sunken reef extending N.W. half a mile. Several detached rocks, upon which the sea generally breaks at low water, extend for 2 miles to the northward of Reef point.

The COAST.—Between Reef point and a low rocky projection at N.N.E. 5 miles from it, the low coast forms a sandy bay 1½ miles deep in its southern part; but it is inaccessible to vessels on account of the rocks in it, and the shoal water which extends nearly 2 miles off shore to the westward. Behind a flat, which dries nearly half a mile off the southern shore of the bay, there are some wells of brackish water, used for watering the sheep of the neighbouring stations.

The low rocky northern point of the shallow bay just described has a grassy summit and a sandy beach on either side. From this point the coast trends North 3 miles to some low red cliffs in a small open bay, and mostly consists of red cliffs, rising in one place to the height of 54 feet above high water. This part of the coast is more bold than that to the southward or northward, there being generally 3 fathoms within half a mile of the cliffs. The coast from the little open bay just noticed consists of a sandy beach extending N. by W. ½ W. 4 miles to some bare white sand-hills, close to which are the Tipara wells; but the water is brackish. From the bare white sand-hills a continuation of the sandy beach trends N.N.W. 3½ miles to cape Elizabeth, and is bordered with rocky ledges, which in some places run out half a mile.

There is no anchorage to be recommended between Island point and cape Elizabeth, there being no good holding ground along this coast, which is, moreover, exposed to the westward.

Fish is plentiful all along shore, between port Victoria and cape Elizabeth, principally schnapper, mackerel, and whiting.

DIRECTIONS.—In working down this coast small vessels generally keep close inshore; but large ones should not approach the bay north of Reef point, within 2 miles, as the water shoals suddenly in some places, from 6 fathoms to less than 6 feet.

Soundings.—There are regular soundings in 25 to 28 fathoms, fine brown sand, across Spencer gulf from Corny point to Dangerous reef northward of Thistle island. At 3 miles off the reddish cliffs along the centre of the bight between Reef point and cape Elizabeth there are 8 fathoms, from which the depth gradually increases westward, to 17 and 18 fathoms at about 25 miles from the coast.

CAPE ELIZABETH, the south-west point of Tipara bay, is a rounding sandy point, clothed with scanty vegetation; a long sandy beach, with rocky ledges stretching out one quarter of a mile to half a mile from the shore, extends S.S.E. ½ E. from the cape; and on its north-east side is a small cliffy point. Close to the southward of the cape are some sandhills covered with bush, but which from seaward, appear as separate lumps the highest being 70 feet above high water. The land behind the cape is very low, level, and grassy.*

Reef.—A ledge of rocks runs out about 3 cables from cape Elizabeth; and a dangerous rocky patch, which shows awash at low water, springs, lies with its outer edge, N.W. by W., a little more than three-quarters of a mile from the cape, with a 2-fathoms channel between them; but the channel is of no use, as the tide streams rush through it N.E. and S.W. at the rate of nearly 3 knots.

Buoy.—A red pyramidal buoy has been moored in 4½ fathoms water, at 3 cables westward of the shoalest part of the reef, with cape Elizabeth bearing E. by S. ½ S., and the lighthouse on Tipara reef N.N.W. ¾ W. The buoy may be seen in clear weather, at 2 miles distance.

Dangers.—A small 3-fathoms rocky patch lies about N. ¼ W. a little more than a mile from cape Elizabeth; and at N.N.E. between 1½ and 2 miles from the cape is a shoal nearly half a mile in extent, with 2¼ to 3 fathoms water on it. There are 3½ fathoms between the shoal and the rocky patch, and 3½ to 6 fathoms between the latter and the other rocky patch before noticed, off cape Elizabeth.

The Soundings off cape Elizabeth deepen to 8 and 10 fathoms, out to the distance of 4 miles, over a sandy, rocky, or coral bottom; and at 13 miles off the cape there are 12 and 13 fathoms, mixed sand.

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* *See* Admiralty plan: Tickera point to cape Elizabeth, including Wallaroo and Tipara bays, No. 402; scale, $m = 1 \cdot 2$ inches.

TIPARA BAY extends from cape Elizabeth N. by E. ½ E. 8 miles to Long point, and is 3 miles deep. Its eastern shore is only 2½ miles distant from the Moonta copper mines, which are the most valuable and productive on the Yorke peninsula. This fine bay is used as a shipping place for the ore raised, for which purpose it may be made as available as Wallaroo bay to the northward.

The Shore.—From cape Elizabeth the southern shore of Tipara bay trends eastward 2½ miles to the western point of the southern bight of the bay, which curves round eastward and northward 3 miles to Sand-hill point. Rocky ledges project 200 to 300 yards from the shore for about 1¼ miles eastward from the cape, and there is a small ledge at the head of the bight. The southern shore of the bay is fronted by a sand-flat, which dries half a mile to nearly one mile from the land; and there are some salt swamps behind the bight.

At nearly E.N.E. 4 miles from cape Elizabeth is a sand-hill 100 feet high, and is one of the most elevated hills bordering upon Tipara bay. This, like those farther to the northward, is covered with bushes, except on its side, where a considerable bare space distinguishes it from the other hills. This sand-hill, when seen from off the northern extreme of the bay, appears as a point.

From Sand-hill point, which has a rocky ledge projecting from it a quarter of a mile to low-water mark, a sandy beach trends N.N.E. 2 miles to Middle point, and is backed by sand-hills 50 to 60 feet high, covered with bush. From nearly one mile off Sand-hill point, the 3-fathoms edge of the shoal water fronting the shore gradually closes the land to about 1½ cables off Middle point.

Middle point, on which is the site of port Hughes, is a rocky projection, with a smooth grassy summit, and may be more closely approached by large vessels than any other part of the shore in Tipara bay, there being anchorage in 4 fathoms, ooze, at about 3 cables westward of the beach.

The eastern shore of Tipara bay, after receding a quarter of a mile eastward from Middle point, trends N.N.E. 2 miles, and mostly consists of sandy cliffs of a light reddish colour, with rocky points and ledges of rocks projecting to low-water mark, 200 to 400 yards from the shore. At 1½ miles northward of Middle point the land rises from the shore to a hill 105 feet high; the land to the north-eastward of the point being smooth and grassy.

From three-quarters of a mile N.N.E. of this hill, the coast curves round north-westward 3 miles to a low point, and forms a fine sandy bay, with a sand-flat that dries nearly half a mile out at low water, and the 3-fathoms edge of the shoal water fronting it, extending one-third of a mile to one mile from the shore.

Soundings.—Between the shoal water extending from Long point and the north-eastern shore of Tipara bay, there are 4 fathoms at about 1½ miles from Long point, and from the beach to the eastward.

From 2 miles southward of Long point to about the same distance north-eastward of cape Elizabeth, a space of 4 miles, the depth of water only varies from 6 to 5½ fathoms, with 5 to 4 fathoms within one mile of any part of the eastern shore, and 5 fathoms within half a mile of the Middle point of the bay, the bottom being sand and shells.

LONG POINT.—From the northern extreme of the sandy bay just noticed, a low mangrove shore, with rocky ledges projecting half a mile to the southward, extends 1½ miles westward to Long point, the northern extreme of Tipara bay; the extremity of this point is rocky, and about 20 feet high, with a mangrove shore on either side.

Small vessels may pass inside Long point buoy, taking care not to bring cape Elizabeth to bear to the westward of S. ½ W., so as to avoid the Walrus rock. With the above bearing a vessel will be in 2½ fathoms at low water springs, with Walrus rock distant about a mile.

The 3-fathoms edge of the shoal water stretching out from Long point extends from 1¾ miles southward of the point to Long point buoy, and then sweeps round in a N.E. direction towards Wallaroo bay. At about 6 miles from the land there are 6 fathoms, and where the depth of water is less than 6 fathoms, the bottom is generally sand covered with grass or weed; but West and S.W. of Long point, where the soundings exceed 6 fathoms, the bottom is generally coral.

Beacon Buoy.—A large beacon buoy lies in 3 fathoms, at the west extreme of the shoal water extending from Long point, with cape Elizabeth bearing S. ½ E., and Long point E. by N. ½ N. The buoy is 9 feet in diameter and surmounted by a pole 18 feet in length, with a triangular head, having in each face a glass reflector one foot square, with a ball above.

Moonta, a mining township about 2 miles inland from the Middle point of Tipara bay, near which is situated port Hughes. There are several copper mines in the vicinity, but the most productive of all are the mines bearing the name of the town, which were discovered in 1861, and give employment to 1,300 hands. In the first half of 1874, over 11,000 tons of ore were raised, and the gross proceeds amounted to 122,000*l.* There is communication with Adelaide by steam vessel *viâ* port Wallaroo; or by rail, *viâ* port Wakefield and Green plains; also by telegraph. A tramway connects Moonta with Wallaroo, 12 miles distant. The population, including that of the neighbouring mines, in 1881, was estimated at 5,000 persons.

The Government have built a jetty at Moonta, near the township, the jetty is 1,706 feet long, with a depth of 10½ feet at its outer end at low water. There are two cranes on the jetty.

Light.—A *fixed* white light is exhibited from the end of the jetty, which should be visible in clear weather from a distance of 4 miles.

The Moonta Mines lie East 3 miles from the Middle point of Tipara bay, but the buildings and miners' houses cannot be seen from seaward, except from a westerly direction. This part of the country has a very pleasing aspect, it being formed of ridges trending straight in from the sea, and the land covered with long grass, having clumps of scrub here and there, with undulations of moderate steepness.

TIPARA REEF, directly in front of Tipara bay, is an extensive bank of sand 2½ miles East and West, and 2 miles N. by W. and S. by E. The reef consists principally of sand; but there is a rocky patch of an oval shape, 600 yards long and 400 yards broad, which nearly dries at low water springs; this patch is marked by a beacon with a white flag. There is also a small patch with only 3 feet water on it, at about 7 cables N.W. from the beacon. The depths on the reef vary from 1½ fathoms to 2¾ fathoms.

Unless it is blowing very strong, there is only a small break on the rocky patch, and none whatever on any other part of Tipara reef; but some of the shallow parts show white, where the sand is clear of weeds. No vessel should approach the reef to a less depth than 7 fathoms.

From the northern extremity of Tipara reef Long point buoy bears E.N.E., distant 3 miles.

LIGHT.—An iron screw pile lighthouse is erected on the southern side of Tipara reef, with Long point bearing N.E. by E., and cape Elizabeth S.E. ½ E. The light is a *revolving* white light, attaining its greatest brilliancy *every thirty seconds,* elevated 100 feet above high water, and in clear weather should be visible from a distance of 16 miles.

Buoy.—A red buoy has been placed to the westward of a rocky patch with 12 feet water on it, situated at the western end of Tipara reef, in 4 fathoms, with Tipara lighthouse bearing about S.E. by E. ½ E., and the smelting works chimney, Wallaroo, about N.E. by E.

Soundings.—At 4 miles westward of Tipara reef there are 10 fathoms, coral, and on the north-west side the soundings decrease very regularly towards it, but on the south and south-west sides there is a sudden shoaling from 5 fathoms to the edge of the reef.

Between Tipara reef and Tipara bay a broad sandy bank, with 3½ to 5 fathoms water on it, extends from the western part of the shoal water stretching out from Long point to the rocky patches northward of cape

Elizabeth. From the shoalest part (3 fathoms) yet discovered on this bank, the Middle point of Tipara bay bears nearly E. by S. ½ S., and cape Elizabeth S. ½ W.

DIRECTIONS.—A vessel from the southward bound for Tipara bay should approach cape Elizabeth so as to pass about 1½ or 2 miles to the westward of it, to avoid the rocky patch which extends nearly a mile north-westward from the cape; and then steer North till the high sand-hill on the south-east side of the bay bears East, when an E.N.E. course leads right up to Middle point, off which there is anchorage. Middle point may be easily known by the coast to the southward being all sand-hills and bush whilst Middle point and the land to the northward is smooth and grassy.

Southern Passage.—Tipara bay may be entered to the southward, between cape Elizabeth and the rocky shoals to the northward of it, by rounding the cape at the distance of about a mile; and having closely passed the buoy and brought the high sand-hill on the southern part of the eastern shore to bear E. by N. steer for it. This course will lead in 6 to 4 fathoms, about 2 cables length northward of the shoal water extending from cape Elizabeth, and the same distance from the rocky patch to the northward.

From the Westward.—Vessels rounding the south extreme of Tipara reef should not bring cape Elizabeth to bear to the southward of S.E. ½ E.; whilst those intending to enter, or pass out of Tipara bay to the northward of this danger, should not bring Long point buoy to bear northward of E. by N. ½ N. Long point, if visible, kept in line with the buoy bearing E. by N. ½ N., will lead a quarter of a mile northward of Tipara reef, in about 4 fathoms.

Anchorage.—In south-westerly gales there is good anchorage in 4½ fathoms water, mud, in the southern part of Tipara bay, with the north-western point of cape Elizabeth bearing S.W. by W., and the high sand-hill E. ½ N. Vessels can also anchor off Middle point in 4 or 5 fathoms water, at half a mile from the shore.

Tides.—The flood stream sets N.N.E. and the ebb S.S.W. 2 knots over Tipara reef; outside it the stream sets more North and South.

In Tipara bay the flood sets round the coast to the northward, and the ebb to the southward. Off Middle point the streams set N.N.E. and S.S.W.; and along the south side of the bay they set East and West.

Off cape Elizabeth the tide streams are stronger than in Tipara bay, and set N.E. and S.W., about 2 knots. But as they are irregular and rapid in the vicinity of Tipara reef, cape Elizabeth, and Long point, the influence of the tide streams must be guarded against in these localities.

WALRUS ROCK, N.N.W. ½ W. nearly one mile from Long point, is a dangerous patch 400 yards long, N.E. and S.W. and 200 yards broad. Although there is not more than one foot at low water, springs, on some parts of this patch, the sea does not break upon it in ordinary weather as the shallow water outside it prevents any sea from rolling in. There are, however, strong tide ripples over the rock; notwithstanding which, small coasters have struck on it. There are only 9 feet water between Walrus rock and the shore.

A Rock having only 4 feet water on it, is stated to exist about N.W., nearly one mile from Walrus rock. As this danger lies in the track of small vessels proceeding to and from Moonta and Wallaroo, they are recommended to give the neighbourhood a wide berth.

Clearing Marks.—Commander Hutchison erected a pile of stones on the north-east part of Bird reef, at N.N.E. ½ E. 2¼ miles from Long point, which, if still remaining, would be a good mark for clearing Walrus rock, by keeping the pile in line with or open eastward of the smelting chimney at Wallaroo, the latter bearing N.E. by E., which will lead half a mile outside Walrus rock between it and the position given to the rock above mentioned, in 2 fathoms water. Long point not brought to the southward of S.E., leads clear to the south-west of both these dangers.

The COAST from Long point takes a general N.E. direction 6¼ miles to Hughes point, the southern extreme of Wallaroo bay, and consists of a low sandy beach, in some places fringed with mangroves, and having rocky ledges projecting from half a mile to 400 yards upon sand-flats, which front the shore, and at low water, springs, dry out 1½ miles to Bird reef. Between Long point and Bird reef the flat dries out above three-quarters of a mile, and north-eastward from the reef, the outer edge of the flat closes the shore to about 300 yards off Hughes point.

BIRD REEF, which lies nearly N. by E. ¾ E. 2¼ miles from Long point, and 1¼ miles from the shore, is a hard rocky ledge about a quarter of a mile long, N.E. and S.W., and 200 yards broad; it is awash at high water, springs, but at other times is generally covered with birds. There are 2 fathoms water at 2 cables westward of Bird reef.

To clear this danger Long point buoy should not be brought to the westward of S.W.

BIRD ISLES, which are low and covered with mangroves, are situated in line, N.W. by W. ½ W. and S.E. by E. ½ E., on the sand-flat between Bird reef and the shore. The outer isle is half a mile, and the other 200 yards long, both being less than 200 yards broad.

Soundings.—From 2½ miles north-westward of Long point the 3-fathoms edge of the shoal water which fronts this part of the coast trends

N.E. by E. ½ E. 4 miles to a narrow spit, with 2¾ to 3 fathoms on it, extending 1½ miles to the north-eastward, and 1¾ miles off shore. From the bight within this spit the 3-fathoms edge of the shoal water closes the shore to about a quarter of a mile off Hughes point. There are three 3-fathoms patches between the spit and Wallaroo bay, lying, respectively, West one mile, W. by N. three-quarters of a mile, and W.N.W. 1¾ miles from Hughes point.

Hughes Point, the southern extreme of Wallaroo bay, cannot be distinguished by vessels entering the bay until close into the anchorage. From the westward this point appears as a small red patch on the coast, it being only a red cliff about 25 feet high ; but at one-third of a mile south-westward of the point there is a hill 52 feet high, close to the shore. The Magazine establishment is kept at Hughes point.

WALLAROO BAY is situated about half-way up the east side of Spencer gulf, and was in 1862 the only shipping port for the copper ore raised from the adjacent mines on Yorke peninsula. This bay extends from Hughes point N. ½ W. 3½ miles to Riley point, and is about 1½ miles deep. There are regular soundings in 4 to 5½ fathoms across the bay, from half a mile northward of Hughes point to about one mile southward of Riley point, and from that line to within half a mile of the shore there are 5½ to 4 fathoms, over an even bottom of sand and weed.

From Hughes point the southern shore of Wallaroo bay trends N.E. by E. ½ E. one mile to Wallaroo jetty, and may be approached to a quarter of a mile in 3½ to 4 fathoms water.

From the wells, which are three-quarters of a mile N.E. from the jetty, a fine sandy beach extends N. by W. ½ W. 1½ miles, and is bordered by a sand-flat, which dries off about 2 cables at low water, and has some rocky ledges on it to the northward. From the northern extreme of this beach a rugged rocky coast trends N.W. 1½ miles to Riley point. The shore between the wells and the point may be approached within half a mile in 3½ fathoms.*

The Bar.—At about 5 miles off shore, abreast of Wallaroo bay, there are soundings in 10 and 11 fathoms, sand and shells, from whence the depth of water rapidly decreases to 4½ and 3½ fathoms on a sort of broad flat bar stretching across outside the entrance of the bay, within which, as just stated, there are 5½ fathoms.

As the depth of water on the southern part of this bar decreases to 3 and 2¾ fathoms on the spit to the south-west of Wallaroo bay, the anchorage, though apparently open and exposed, is only so with winds from N.W.

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* Storm signal :—A blue flag will be hoisted at Wallaroo, on the indication of bad weather.

by N. round to West, which winds rise the most sea ; and even from N.W., the 4-fathoms part of the bar breaks much of the sea, which cannot be very great, as the western coast of Spencer gulf is only distant about 30 miles. The spit to the W.S.W. protects the anchorage from winds in that quarter.

Reported Dangers.—Numerous dangers have from time to time been reported to lie between the bearings of W.S.W. and W.N.W. from Wallaroo jetty ; but except those already noticed, Commander Hutchison could find none. He therefore attributes these reports to the shoal appearance of the water when running in from 10 and 11 to 4 and 3½ fathoms, when the bottom becomes distinctly visible; the weeds growing at the bottom appearing in the sun quite brown, like rocks, with white sand between them. But the lead brought up nothing but sand from an apparently even bottom ; no breakers being ever seen or reported.

Wallaroo.—From Hughes point the southern shore of Wallaroo bay, although somewhat rocky, may, as before stated, be approached within a quarter of a mile in 3½ to 4 fathoms, and there are 2½ fathoms, close to the jetty, immediately behind which is situated Wallaroo.

The township of Wallaroo is elevated about 50 or 60 feet above the beach. The rise of Wallaroo has been rapid, since the discovery of the famous Wallaroo copper mines in 1860, at which time there was only one house in the bay, and the present town site was part of a sheep-run. A railway connects the mines with the port. The population, in 1881, numbered 1,869 persons, mostly interested in copper. There is telegraphic communication with Adelaide. A steam vessel calls on her way between port Augusta and Adelaide; and communication with Adelaide is kept up by coasting vessels; ; also the mail by rail *viâ* port Wakefield.

The new jetty, which is of wood, and in connection with the railway, extends about 1,605 feet into 23 feet water at low water, springs, giving births for six vessels, from 140 to 300 feet in length. There is a double line of rails along the old jetty, which is 800 feet in length, in connection with a tramway, communicating with the inland town of Kadina and the Wallaroo copper mines. The depth of water at the end of the jetty is 16 feet at low water.

The Custom-house is a one-storied stone building near the shore, at about 150 yards eastward of the jetty. It is also the court-house and residence of the sub-collector of customs, who, as at port Augusta, is also harbour master, shipping master, &c.

Smelting is carried on, on a very extensive scale, and the works are the largest in the colony. There is a large smelting establishment for copper ore close to the water's edge, at about 300 to 400 yards to the eastward of the Custom-house. The chimney, which is square and built of light-coloured bricks, rises from about the centre of the works to the height of 140 feet above high-water level. As it is much higher than any of the adjacent land, it appears from seaward very distinctly against the sky, and can be seen over Long point.

During the frequent northerly winds the chimney is apparently so raised by mirage that it can be discerned 20 miles off, and has been distinctly seen from a boat off cape Elizabeth, a distance of 15 miles. In a calm morning the smoke may be seen at a much greater distance.

The smelting furnaces are arranged in a long line facing the north-west, and from seaward have some resemblance to a heavy battery with more than 30 embrasures, so that the light from the furnaces would be seen from a vessel within 6 miles north-westward of Wallaroo, as one or two doors are nearly always open, showing a brilliant light near the water's edge.

At N.N.E. half a mile from the smelting works chimney is a bare sand-hill, at the foot of which, on the beach, are some wells of brackish water, where most of the live stock of Wallaroo are watered.

Supplies.—Fresh meat, both of beef and mutton, may be procured at Wallaroo; also abundance of firewood, but no vegetables nor fruit.

Water.—As the wells are brackish, and the rainfall is small and mostly confined to the winter months, from November to April, water is very scarce at Wallaroo, there being no river nor standing water of any kind in the vicinity. Water can be procured from the corporation tanks. Vessels likely to remain at Wallaroo for any length of time should be well provided with water, or fitted, as some of the regular traders are, with a distilling apparatus on board.

RILEY POINT, the northern point of Wallaroo bay, is a cliffy projection, but it is not easily distinguished until well in to the southward or northward of it, the back land being very much more elevated than the point, which is only 45 feet high. A ledge of rocks projects about a quarter of a mile westward and south-westward from the point; and the soundings for more than half a mile off it are irregular, and the bottom is rocky.

Riley Shoal, the west extreme of which lies S.W. by W. ¼ W. 1¼ miles from Riley point, and N.W. ½ W. 3½ miles from the smelting chimney, is a bank of hard sand, with 9 feet on its shoalest part, at low water springs. This bank is about 800 yards long East and West, and 300 yards broad, with its shoalest part showing white, from the tide streams having washed away the weed, which seems to thickly cover the sandy bottom in other parts of Wallaroo bay.

Light.—A *fixed red* light, elevated 23 feet above the sea, and visible in clear weather for a distance of 4 miles, is exhibited at the extremity of the jetty.

Buoys.—A black and red chequered buoy is placed on the northern side of Riley shoal near the shoalest part, with Riley point bearing N.E. by E. ¾ E., rather more than a mile, and the smelting chimney S.E. ¼ E., nearly 3½ miles. Vessels should not approach this buoy under 4 fathoms when working into Wallaroo bay.

Two 3-fathoms rocky patches, with 3½ to 4½ fathoms about them, lie nearly midway between Riley shoal and the south side of Riley point; and a rocky shoal, having 2¾ fathoms on it, with a 3-fathoms patch at 2 cables to the south-westward of it, lies N.W. by W. ½ W. nearly one mile from the point. For a radius of about one mile from Riley shoal the soundings are irregular, varying from 5 and 4½ fathoms to the westward, to 5 and 3½ fathoms to the southward and south-eastward of the shoal.

A red perch buoy is placed close to a shoal patch, with 16 feet at low water, lying about a mile to the southward of Riley shoal buoy, with the following bearings:—Extreme of Riley point N.E. by N. (northerly), and the smelting chimney at Wallaroo S.E. by E. ½ E.

Vessels beating up to the anchorage with S.E. winds are recommended not to bring the jetty to the southward of E.S.E., until Riley point is brought to the northward of N.N.E.

Aspect.—The land between cape Elizabeth and Riley point presents no prominent feature to a vessel running up for Wallaroo bay; and at 10 or 12 miles off the land the outline appears nearly straight and of a uniform dark colour, from the thick scrub that clothes the back land. The objects on the coast are low, and not seen distinctly until close in. During the frequent northerly winds the mirage is so great that everything appears distorted, and the aspect of the coast entirely different to what it is on ordinary occasions.

DIRECTIONS for WALLAROO BAY.—In running up for Wallaroo bay from the southward, during the daytime, it would be advisable, in a large vessel, to shape a course to pass 8 miles westward of cape Elizabeth. If that cape be distinguished, steer North or N. by W. until Wallaroo smelting chimney be seen, taking care not to approach Tipara reef in less than 7 fathoms.

When the smelting chimney bears E.N.E. a N.E. course may be steered, as the north point of Tipara reef will be well to the southward. When the chimney bears East a vessel may haul right in for it; but if she is of heavy draught, run in with the chimney bearing E. by S. or E.S.E. The former course passes over 3½ fathoms, and the latter 4 fathoms.

On getting within a mile or two of the anchorage, vessels are boarded by the harbour pilot and anchored in a convenient place to discharge or land cargo by lighter; or if under 15 feet draught, to haul alongside the jetty. If the harbour master or pilot cannot go off, the best anchorage is in 4 fathoms, sand, with the smelting chimney bearing E. by S. to E.S.E., and Hughes point S.W.

Should a vessel run too far to leeward, and have to work back into Wallaroo bay against a south-east or south wind, or work out against a north-west wind, tack off shore when the chimney bears S.E. by E., if Riley point is to the eastward of N.N.E. to avoid Riley shoal. When to the southward of that danger the chimney may be brought as far southward as S.E. by S.

If, since the establishment of the Tipara reef lighthouse and the Long point buoy, a passage nearer the land be preferred by vessels proceeding from the southward to Wallaroo bay, they should not approach the lighthouse from the westward in less than 7 fathoms. From about 2 miles westward of the lighthouse steer a N.N.W. course in 6 and 7 fathoms till Long point buoy bears East; when steer N.E., taking care as Long point buoy is brought to bear S.E. not to go into less than 4½ fathoms. When Long point bears South an E.N.E. course may be shaped, and the pilot and harbour master will board the vessel and conduct her to the anchorage or jetty.

Working.—Large vessels working up for Wallaroo bay from the southward should keep outside Tipara reef, not shoaling to less than 7 fathoms, or not bringing cape Elizabeth to bear southward of S.E. till the smelting chimney bears N.E. by E. ½ E., when the vessel may stand into 4½ fathoms, taking care not to get into less water till the chimney bears East, as the water shoals quickly from 9 to 4 and 3 fathoms.

Inner Passage.—To pass eastward, or inside Tipara reef from the southward to Wallaroo bay, give cape Elizabeth a berth of 1½ miles, to avoid the rocky patch before mentioned, and when the cape bears S.E. distant 1½ miles steer N. ½ W., which will lead through the inner passage between Tipara reef and Tipara bay, in not less than 4 fathoms, passing three-quarters of a mile eastward of Tipara reef, and nearly the same distance westward of Long point buoy.

Beating through, keep the lead going and when standing in shore, a vessel drawing more than 17 feet should not bring Long point buoy westward of W.N.W.; and in standing off, when to the southward of the parallel of the north extreme of Tipara reef, the eastern extreme of the reef will be avoided by not bringing Long point buoy to bear eastward of N.N.E.

Small vessels may pass inside Long point buoy, taking care not to bring cape Elizabeth to bear westward of S. ½ W., so as to avoid Walrus rock, and the sunken rock N.W. a short mile from it, which latter with the above bearing of the cape, will be passed in 2½ fathoms at the distance of half a mile.

At NIGHT no vessel in the vicinity of Tipara reef should go into less than 7 fathoms nor attempt to enter Wallaroo bay until the lights from the smelting works are clearly defined, bearing E. ½ N, when that course may be shaped for the anchorage, taking care to avoid the spit at 2 miles westward of Hughes point, and not to go into less than 6 fathoms, unless the pilot has taken charge, or the commander is well acquainted with the bay.

Anchorage.—There is good anchorage in Wallaroo bay, in 4 fathoms, water, with the old jetty end bearing E.S.E. distant 2 cables. Vessels can anchor in 3 fathoms, with the end of the old jetty bearing S.S.E. to South, or may find berths alongside the jetties. The surveying schooner *Beatrice* rode out a W.N.W. gale at single anchor, with 30 fathoms of chain.

Vessels alongside the new jetty use the moorings. Vessels alongside the old jetty have an anchor laid out well to the N.N.W. with a long scope of chain; and in casting off swing clear when the wind is from N.W. to W.S.W., the only winds which throw any sea, into Wallaroo bay.

Pilotage.—It is not compulsory for a vessel to take a pilot.

TIDES.—It is high water, full and change, in Wallaroo and Tipara bays, at 5 h. 45 m.; springs rise 4 feet 8 inches, but both the time of high water and the rise and fall seem subject to the wind. When there is no disturbing cause the ebb and flow are regular at the time of springs, and for two or three days before and after; but at neaps there are great irregularities, the tide sometimes remaining nearly stationary for 24 hours, and with one ebb and flow during that period, at which time the stream along the coast becomes very weak and irregular. The ordinary methods of finding the time of high water are impracticable at Wallaroo, as it is frequently high water at about the same time every day for a week.

Light easterly and northerly winds bring the lowest tides and south-westerly gales the highest; in the latter case high water generally remains stationary till the wind begins to lull. In summer the tide generally falls about a foot lower than in winter, and they are more regular. A westerly gale seems to have the same effect on the stream that it has on the rise and fall, causing a long flood stream, and stopping the ebb altogether.

As a general rule, for summer springs, it is high water at 6 a.m.; low water at noon, or an hour before. For winter, high water, 6 p.m.; low water, midnight.

Tide Streams.—At the anchorage in Wallaroo bay the stream is barely felt; but when the wind is blowing strong into the bay there is a sensible set to windward. Outside the line from from Hughes point to

Riley point the flood sets to the N.E., and the ebb to the S.W., about one knot.

Outside Tipara reef the streams set North and South, but within it the streams follow the line of coast.

Winds.—During the four months, from August to November 1862, no particular wind could be said to prevail, as it shifted round the compass every three or four days. After a day or two of calms, or land and sea breezes, the former from the East, and the latter from S.W., the wind veered round to the northward; at first light with a clear sky, the barometer falling sometimes to 29·5 inches, and the land on the opposite side of the Spencer gulf becoming miraged into view.

If the wind shifted to N.W., and the sky became overcast, and the barometer showed no signs of rising, a gale was expected. On the barometer beginning to rise, the wind shifted round to West and S.W., with a clear sky. When the wind in veering round gets to S.W. or West, and backs round to N.W. again, some heavy weather may be expected, which sometimes lasts two or three days.

The wind from the northward is very hot, even in winter, and the shift of wind to the westward sometimes comes in heavy squalls, accompanied by thunder and lightning, the blast being extremely hot. If the wind shifts from North right round to S.W., and does not back, and the barometer suddenly rises, the weather remains fine.

From November to March the prevailing winds are South and S.W., sometimes blowing for weeks together in Spencer gulf, with land and sea breezes in shore, the south-west wind sometimes blowing very freshly, but occasionally interrupted by a day or two of hot wind from the North.

The Barometer is a very good guide, and rises rapidly as a gale shifts to the S.W., after which the wind soon subsides.

TICKERA BAY.—From Riley point a rocky coast and limestone cliffs trend N.N.E. ¾ E. 3½ miles to Tickera point, and in the same direction for 5 miles further to Tickera bay, a slight indentation of the coast, with a smooth sandy shore, fronted by sand-flats, and extending from the end of the cliffs, N.E. by N. 4 miles. At about the middle of the bay is a red cliff 44 feet high, with some huts to the southward of it.

Anchorage.—Tickera bay affords anchorage in 3 fathoms, at about one mile off shore, sheltered from winds southward of S.W., with the huts bearing S. by E. This anchorage is partially protected by a 2 and 3 fathoms spit, which runs out north-westward from the shore.

The COAST.—From Tickera bay a smooth sandy beach extends N.E. by N. 4½ miles to a small bight, and from thence continues in the same direction 5½ miles to Webling point. The whole of this beach is fronted by a flat stretching out one to 2 miles, with 3½ and 4 fathoms water within about 2 miles of the shore, except off Webling point, where a 2½ fathoms spit runs out 3 miles W.N.W. from the point. From Webling point the low shore sweeps round north-eastward about 3 miles to the entrance of the southern Hamilton lagoon.

Aspect.—The back land between Riley point and Webling point rises to between 100 and 200 feet high, at 2 or 3 miles in shore; it is nearly level, and covered with thick scrub. From a distance at sea the clear grassy spaces at Tickera looks like the face of a cliff.

Webling Point is more elevated than any of the coast to the northward, and is thickly covered with green scrub and stunted pines; there is a bank of reddish earth 50 feet high, just to the northward of the point.

TIDES.—It is high water, full and change, at Webling point, at 6h. 10m.; springs rise 6 to 9 feet.

Hamilton Lagoons are two shallow inlets to the eastward and north-eastward of Webling point, surrounded by swampy land, except on their east sides, which are thickly wooded; the entrances are about 2 cables wide, with narrow boat-channels leading in through the sand-flats which extend nearly 2 miles off shore.

The channel leading into the southern lagoon has 6 or 8 feet at low water, and in some parts more than 2 fathoms; but the entrance cannot be distinguished until close in with the land, as it is embayed and hid by mangroves. From the entrance this lagoon runs in about 2¼ miles to the southward, and is 1½ miles wide at its southern end; but at low water, springs, it is nearly dry. Here is situate port Broughton.

The entrance of the northern lagoon lies 2¾ miles northward of that just described, and can be plainly distinguished from seaward, it having a red cliff on its north side, and a small mangrove islet at W.S.W. one mile from it; but the channel leading into it is entirely blocked up at low water, springs. This lagoon runs straight in from the entrance, nearly at right angles to the coast, and is about 2 miles in extent; but, like the southern lagoon, is nearly dry at low water, springs.

The COAST.—From the entrance of the northern Hamilton lagoon the coast trends N. by W. 8 miles, and West 2½ miles to Woods point, and forms a sandy beach, having low swampy land behind, and being fronted by a hard sand-flat, which dries 2 to 4 miles out.

PORT BROUGHTON.—The next port north of Wallaroo, where the Government have built a jetty, and dredged Mundoora channel (a new channel which has opened out), to a depth of 5 feet at low water. This port is the nearest to a rich wheat-producing country, east of the Barn hill range. The jetty is 1,260 feet long with 12 feet water at its outer end. Port Broughton is connected with the town of Mundoora

10 miles inland, and will be with Barunga range railway distant 32½ miles.

Mundoora Channel, leading to port Broughton is marked by one perch buoy at the entrance, 13 tub-shaped buoys, 19 cask buoys, and 5 pile beacons, all painted red, to be left on the starboard hand going in. On the port hand, one perch buoy at the entrance, and 3 pile beacons, all painted black.

Directions.—Vessels from the southward, and bound for Mundoora channel, after passing Riley point should not approach the land under 6 fathoms of water, in order to avoid the long hard sand-flat, which dries at low water springs, and extends from Tickera bay to the entrance of the channel, a distance of 17 miles, and running out from the land, in one instance, for nearly 2½ miles. With Riley point bearing East 4 miles distant, a course of N.N.E. ½ E. 25 miles will lead into a good position for entering the channel, and about 4 miles off, at this distance the outer bar beacons marking the old entrance will be distinguished; if not, bring Barn hill (a flat-topped mountain) with a saddle and small peak immediately north of it—remarkable objects from the offing—to bear E. ½ S., then run in.

Vessels coming in should leave the red buoys on the starboard hand, and when approaching the entrance, should bear towards the perch buoys, as by passing either of these at a distance of 70 or 80 feet they will avoid a small knoll which lies in mid-channel, and has a foot less water upon it.

By following these directions, when nearing or crossing the entrance, not less than 5 feet at low water will be obtained.

The Bar consists of a long shallow patch, of about 150 yards in length, covered with grass, and extends across the whole breadth of the channel.

Anchorage.—Large vessels can bring up in 5½ fathoms water, good holding ground, about 1½ miles to the westward of the outer bar.

Wood Point, nearly N. ½ W. 12 miles from Webling point, is a low sandy projection, with a clump of trees a little in-shore; the sand-flat fronting it dries out 3 miles at low water, springs, and a spit runs out from the flat W.N.W. 4 miles from the point.*

Jarrold Point.—The low sandy beach from Wood point sweeps round north-eastward 3 miles to a swampy bight, with clumps of wood behind it, extending 2½ miles across from S.E. to N.W., from whence the low shore trends north-westward 4½ miles to Jarrold point, which is low and sandy. This coast is in some parts broken where the water forces its way into the swamps behind. The sand and mud-flats which border the shore, and uncover at low water, springs, extend about 1½ miles off Jarrold point.

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* *See* Admiralty chart, Wood point to Lowly point, No. 403; scale $m = 1 \cdot 0$ inch.

A shoal, reported by the master of the ship *Blengfell*, is stated to have 5 fathoms over it, and to be situated in lat. 33° 26′ S., with mount Young bearing N. by W. ¾ W. (distant 20½ miles), or in long. 137° 36′ 10″ E.

A 4-fathoms shoal, marked by a chequered red and black buoy, lies 10 miles northward of this shoal, *see* page 131.

The COAST.—From Jarrold point the mangrove shore trends N.N.E 3½ miles to the southern entrance point of Germein bay. The low land behind is partially flooded at high water, springs, and the sand and mud-flat which borders the shore dries out 1½ miles at low water, springs.

Soundings.—The whole of the sand and mud-flats which extend along shore from Hamilton lagoons to the southern entrance point of Germein bay are fronted by shoal water of 2 to 3 fathoms, its average extent from the flats being about 2 miles, with a 3-fathoms spit extending 3 miles north-westward from Jarrold point.

Aspect.—From a hill seen from Spencer gulf, bearing E. ¼ N., distant 26 miles from Riley point, a hilly range takes a general N. ½ W. direction nearly 30 miles to a hill, 612 feet high, bearing East, distant 11½ miles from Wood point.

Barn hill, E. ½ N. 13 miles from Webling point, is a conspicuous object 1,169 feet high, having a flat top, and a saddle with a small peak immediately North of it ; and at 9 miles farther South is another hill, which is 1,370 feet high. But these hills, like the Middle-back range on the west side of Spencer gulf, are too distant to be of much use to the navigator.

Middle Bank, which lies nearly midway between Webling point and the opposite side of Spencer gulf, and has 3 to 4½ fathoms water on it, extends N. ½ E. and S. ½ W., 9½ miles, and is about 3 miles across. The shoalest part is a patch 1½ miles long and half a mile broad, having 3 fathoms on it; it is situated near the north-eastern edge of the bank, with Riley point bearing S. ½ E., distant 17 miles, and Plank point N.W. by W ¼ W. nearly 15 miles. The southern extreme of Middle bank lies S. by W. 7 miles from the centre of its shoalest part.

Soundings.—From Tipara reef to Middle bank the soundings are mostly regular, over a sand and coral bottom. Between Middle bank and the shoal water extending from the western shore, southward of Plank point, the channel is 8½ miles wide, with 6 to 15 fathoms, coral.

Between the southern part of Middle bank and the shoal water bordering the east coast about Tickera bay there is a space 5 miles wide, with 6 to 11 fathoms. A shoal spit extends S.W 15 miles from the sand-flat which fronts Wood point; the extremity of this spit, on which there are 4¾ fathoms, lies 7 miles off shore, and 3 miles eastward of Middle bank.

There are 3¼ and 3¾ fathoms on the middle of the spit, with 4 to 4¾ fathoms towards its south-west extreme, and 4 to 3½ fathoms towards the sand-flat of Wood point. A patch with 4¾ fathoms on it, lies 2 miles southward of the south-west extreme of the spit, in the track of vessels going to port Broughton.

There is a channel 2 miles wide, with 7 to 10 fathoms, coral, between Middle bank and the spit; and between the spit and the shoal water fronting the east coast there is a space 4 miles wide leading to port Broughton, with 5¼ to 8 fathoms; but there appears to be no certain passage out of it to the northward, except across the inner part of the spit, where there may be not more than 3¼ fathoms.

From Middle bank to a line between Jarrold point and mount Young, a distance of 22 miles, Spencer gulf appears free from any shoal under 4 fathoms, over a width of 14 miles, with 6 to 15 fathoms, sand and coral.

Eastern Shoal is a sand-bank 7 miles long, N.E. by N. and S.W. by S., and one mile broad, having a patch half a mile in extent on its north-east end, which dries at low water, bearing from Lowly point S. by E ¼ E., 5 miles, and from Hummock hill E. by S., distant 11 miles. At 1½ miles south-westward of the patch there are 9 feet water, the depth gradually increasing to 3 fathoms on the south-west end of the shoal. There is a clear channel 3 miles wide, with 6 to 11 fathoms, ooze and fine dark sand and shells, between Eastern shoal and Fairway bank.

Buoy.—A red perch buoy is placed on the western edge of the south end of Eastern shoal, in 18 feet at low water springs, with mount Young bearing W. ½ N., and Lowly point N. by E., 8½ miles.

A red beacon marks the north end of the shoal.

GERMEIN BAY.—From the mangrove point 3½ miles N.N E. of Jarrold point, the entrance of Germein bay extends North 9½ miles to Ward spit, and is 10 miles deep; but it is mostly occupied by sand-banks and shoal water. This bay is frequented by such vessels as go to port Pirie.

Large vessels which come here in the season to load wool, wheat, &c., lie about 2 miles N.W. of mount Ferguson, or at the anchorage southward of Ward point.

From the southern entrance point of Germoin bay its south-eastern shore, which consists of thick mangroves, with partially flooded land behind, trends N.E. ½ E. 9½ miles to the south-western entrance point of port Pirie. This shore is bordered by sand and mud flats, which dry out one mile at low water, springs, and is fronted by a shoal with 3 to 12 feet water on it, extending 3 to 4½ miles from the shore, and occupying nearly the southern half of the bay. At N.W. by N. 3½ miles from the southern entrance point is a 3-feet patch, from which a spit extends 1¼ miles to the south-westward, forming between it and the shore a bight with 4 fathoms water in it.

The outer edge of the shoal fronting the southern shore of Germein bay, after extending N.E. 4 miles from the spit just noticed, curves round eastward and north-eastward, forming a bight 4½ miles broad and 1½ miles deep, in the northern edge of the shoal; and then trends E. by S. 4 miles to within 2 miles of the south-western entrance point of port Pirie, Between the north-western edge of this shoal and Eastern shoal is a channel 1½ miles wide, with 4 to 12 fathoms, forming the southern entrance into Germein bay.

PORT PIRIE, in the south-east bight of Germein bay, is a creek resorted to by vessels in the wool season; its entrance may be recognised by mount Ferguson, on its north-east point, which bears N.E. ½ N., distant 1½ miles from the south-west point of the entrance. From mount Ferguson the mangrove shore curves round southward and forms a bight 2 miles across, the creek between the mount and the south-west entrance point being nearly one mile wide, with a depth of 14 feet in the centre; but the sand and mud-banks on either side close each other southward, leaving a narrow channel between the banks eastward of the south-west entrance point. The channel has been straightened and deepened, and from seaward to port Pirie has a depth of not less than 10 feet at low water. The channel is now being deepened to 12 feet 6 inches, with a width of 150 feet. It is proposed for it to have a width of about 300 feet.

Vessels of 1,500 tons have taken advantage of the improvements by partially loading at the wharves.

Port Pirie, about 30 miles north of port Broughton, is rapidly coming forward as an important place; a township has been formed at the south bend of the creek with well laid out streets, and substantial wharves having nearly half a mile of frontage; and a railway connecting it with the wheat-producing areas; and *viâ* Petersburg with port Augusta and Adelaide. There is also a telegraph station. The population in 1881, was 900 persons.

Port Pirie is built in a swamp, the land about is flooded at spring tides.*

Supplies.—Water is laid on at several of the jetties, and almost any kind of ship's stores can be purchased.

TIDES.—It is high water, full and change, in the entrance of port Pirie, at 6 h. 45 a.m., and 8 h. 30. p.m.; springs rise 9½ feet, but heavy south-west gales cause a rise of 12 feet. At port Pirie, at 8 h. 30 m.; springs rise 9½ feet.

A tide gauge has been affixed to a pile in 7 feet at low water springs, at the entrance of the channel leading to port Pirie. The gauge shows the depth of water in mid-channel between the buoys at the inner bar; it bears N.E. ½ N. from the Fairway chequered buoy, distant 1¾ cables.

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* *See* Admiralty plan of port Pirie, on chart No. 403; scale, m = 2·25 inches.

MOUNT FERGUSON, on the north-eastern entrance point of port Pirie, is a round grassy hill, 130 feet high, and makes out well against the dark scrub which clothes the slopes of Flinders range near mount Bluff, which is 2,301 feet high, and bears E. ½ N., distant 6 miles from mount Ferguson. Mount Ferguson is insulated at high water, the land about it being a mangrove swamp. A sand-flat with a black beacon off its western end, extends 2 miles north-westward from the mount, and then curves in to its south-west side.

From about three-quarters of a mile north-eastward of mount Ferguson the north-eastern shore of Germein bay forms a sandy beach curving north-westward about 6 miles to Ward point; it is bordered by a sand-flat extending about three-quarters of a mile from the beach, with 2½ and 2 fathoms at 2 to 1½ miles from the shore. A black buoy is placed on the 3-fathoms edge of a spit about 2 miles off shore, nearly midway between mount Ferguson and Ward point, and S. ½ E. distant 1½ miles from the jetty end.

The country behind this beach is thickly wooded with gum scrub and pines, and is generally low for 2 or 3 miles inland, when it rises gradually to the foot of Flinders range, which is here from 5 to 7 miles distant.

The township of Germein, on the north side of the bay, is 8 miles East from the entrance at North channel. The jetty is 4,961 feet long, with 13 feet at low water, at its outer end.

LIGHT.—A *fixed red* light is exhibited from the end of the jetty in Germein bay; the light is visible in clear weather for about 4 miles.

WARD POINT, which forms the east, as Lowly point does the west side of the estuary to port Augusta, or the upper part of Spencer gulf, is a round mangrove point, with its south extreme bearing E. ½ S., distant 9 miles from Lowly point.

Ward Spit, which forms the northern side of Germein bay, extends W. by S. 6 miles from Ward point, and is dry at low water springs. A beacon marks its extremity, near the north-west end. Its average breadth is about 1½ miles; but it is much less near the shore, where the water forces a passage over the spit at half-tide. A shoal, with not more than 8 or 9 feet water on it, extends 1½ miles south-westward from the extremity of Ward spit, and from thence continues along the south side of the spit to Ward point, with a breadth of about half a mile, and 3 to 12 feet water on it. The northern edge of Ward spit is also bordered by a shoal, with 7 to 15 feet water on it, extending a quarter of a mile to half a mile from the edge of the spit, and forming a bight at about 1½ miles north-westward of Ward point.

The northern entrance of Germein bay, between the north-east extreme of Eastern shoal and the shoal water projecting from the south-west extremity of Ward spit, is about 2 miles wide, with 4 fathoms ; the depth within increasing to 8 or 9 fathoms. The deepest water in the bay is along the south side of Ward spit, at about one mile from it.

Cockle spit a sandy-bank, uncovered at low water, springs, lies S.S.W. ½ W. 3 miles from Ward point, and W.N.W. 5 miles from mount Ferguson. It is about 1½ miles long, E.N.E. and W.S.W., and half a mile broad, with a narrow shoal enclosing it, and extending more than a mile from its western end. To the southward of this bank the water in Germein bay is nearly all shallow, the depth rarely exceeding 2½ fathoms.

There is a shoal between Cockle spit and the north-eastern extreme of Eastern shoal, with as little as 7 feet water on it; it is about 2 miles long, E.N.E. and W.S.W., with 3½ to 5 fathoms about it. There are also two small shoal patches between Cockle spit and the eastern shore, one with 2¾ fathoms water on it, lying N.W. by W. 3 miles from mount Ferguson, and the other, with 3 fathoms on it, South 1½ miles from mount Ward point.

LIGHT VESSEL.—A light-vessel, painted red, with one mast and carrying a red ball at the mast head by day, is moored in mid-channel leading to Germein bay anchorage, with the following bearings:—Cockle spit beacon E. ¾ N., Eastern shoal S.W. by W. ¾ W., and Ward spit N.W. by W. ½ W. By night a *fixed* white light is exhibited, visible in clear weather for about 8 miles.

Beacons and Buoys.—On the north side of the channel a black cylindrical buoy with a beacon on the top is placed on the south-west end of Ward spit in 12 feet water, with Lowly point W.N.W. 6½ miles ; and the beacon on the north-west end of Ward spit N.N.E. ¾ E. 1½ miles; a black beacon, with a square head, a quarter of a mile further to the eastward on the spit in 10 feet water; a black buoy, with a staff and ball, lies E. ½ N., 2½ miles from the last beacon, in 3 fathoms water on the south edge of Ward spit; and 2¼ miles E. by N. ½ N. is a similar buoy in 3 fathoms water on the south-east edge of the spit.

The south side of the channel is marked by a red pile beacon, surmounted by a ball, and erected on the north end of Eastern shoal ; a red cheese-shaped buoy with a cylindrical framework and ball lies E. by N. ½ N. 6 miles from Eastern shoal beacon, the buoy is in 4 fathoms water, on the north-west or outer edge of Cockle spit ; one mile E. by N. from this buoy is placed a red pile beacon with a ball on top ; a red buoy with framework and ball on top is moored in 3 fathoms water on the northern edge of Cockle spit, at three-quarters of a mile E. by S. from the beacon.

Another cheese-shaped red buoy, surmounted by a staff and ball, lies E. by S., one mile from the buoy just mentioned, in 15 feet at low water. The Fairway or Outer bar buoy of port Pirie is cheese shaped, surmounted by framework and ball, and painted in black and red chequers, the buoy lies S.E. by S., 2¾ miles from the last-mentioned buoy, in 10 feet water; it marks the entrance to port Pirie, and can be passed on either side.

DIRECTIONS.—Vessels entering Germein bay should keep the lead going and a good look-out ahead, as after a few days' fine weather, the water becomes clear and the shoals can be seen. But during and after bad weather, the mud and sand are disturbed from the bottom, and the deepest water is generally the most discoloured.

In entering Germein bay between Eastern shoal and Ward spit, the northernmost detached hill north-westward of False bay, kept just open of Black point bearing N.W. by W. ½ W., will, in 5 fathoms water, clear to the southward the shoal water extending from Ward spit. When Bay hill (a low grassy hummock at N.N.W. 7 miles from Lowly point) is well open of the bluff just to the northward of Lowly point, with the point bearing N.W. by N., an E. by N. course may be steered, which will lead up the bay in the deepest water, between Ward spit and Cockle spit to the southward of it, to the anchorage southward of Ward point.

Or vessels after passing westward of Eastern shoal, and proceeding to Germein bay anchorage, should steer for the light on an E. by N. bearing, and passing the light-vessel at a reasonable distance, continue the same course to the anchorage.

Anchorage, in 3 to 3½ fathoms, may be obtained in Germein bay to the southward of Ward point, with the north end of the long sandy beach bearing North to N.N.E., at about 1½ miles off shore.

Large vessels intending to anchor in the Outer roadstead should be prepared to do so after passing the south-east black beacon buoy on Ward spit.

Due allowance must be made for the tide streams if the wind be light, as the flood sets N.E. and the ebb S.W. across the entrance, about 1½ knots, at springs.

The chart will be found an excellent guide.

BALLAST.—All vessels bound to port Pirie, and requiring to discharge ballast must do so in False bay inside a line of bearing E. by N. ¼ N. and W. by S. ¼ S., between Lowly point and Hummock hill. A large buoy, surmounted by a triangle and ball, and painted white is moored in 6 fathoms water, to denote the ballast ground, inside of which all ballast must be discharged.

Going Out.—In going out of Germein bay a W. by S. course, or a direct course for mount Young, on the western shore, will lead out into Spencer gulf.

For Port Pirie.—If bound into port Pirie, bring the northernmost detached hill N.W. of False bay, before mentioned, on with Black point bearing N.W. by W. ½ W., or Bay hill just open of the bluff land North of Lowly point, bearing N.N.W. ½ W., which will clear to the eastward the north-east extreme of Eastern shoal. Keep these marks on till mount Ferguson comes on with mount Bluff (the summit of the southern part of Flinders range) bearing E. ½ N., then steer in, with these latter marks on.

If drawing more than 8 feet, as the south-west entrance point of port Pirie is approached, edge a little more to the northward. There is good anchorage, in 11 to 14 feet, with the wool-sheds just showing over the east side of the creek, and mount Ferguson N.E. by N.

Southern Entrance.—As there is a channel 1½ miles wide, with 4 to 12 fathoms, between the Eastern shoal and the north-western edge of the shoals extending from the southern shore of Germein bay, there appears to be nothing to prevent its being taken advantage of by steam-vessels or coasters, and others well acquainted with the locality, bound to port Pirie from the southward. Having run up the gulf until Hummock hill is in line with the northernmost detached hill N.W. of False bay, before mentioned, bearing N.W. by N., the vessel might enter the channel at about 5 miles north-westward of Jarrold point, and then steer N.N.E. ¾ E. in mid-channel, until mount Ferguson is in line with mount Bluff, bearing E. ½ N.; or, approach the light-vessel on a N.E. by N. bearing, when she might proceed as just directed, after having entered by the northern channel between the Eastern shoal and Ward spit.

Lights.—Two *fixed* leading lights are exhibited from beacons on the eastern shore, when in line bearing S.E. by E. ½ E. nearly; the upper or inner light *red*, the lower or outer white.

Buoys.—A black and red chequered buoy, surmounted by cylindrical framework and ball, and moored in 10 feet water, lies in the fairway of the entrance to the channel leading to the anchorage off port Pirie; and a black buoy is moored on a detached bank, having one to 5 feet water, situated on the north-east side of the entrance.

Beacons and buoys are placed on each side of the channel leading up to port Pirie, red on the starboard and black on the port. Three white lights from the narrows southward, and two in the upper reaches approaching port Pirie wharves, mark the starboard side of the channel.

DIRECTIONS.—Approaching the outer bar buoy (chequered)—bring the upper leading light, *fixed red*, in line with the lower leading light, *fixed white*, bearing S.E. by E. ½ E. nearly; this leads close past the outer bar buoy moored about 1¾ miles westward of mount Ferguson.

Keep the above-mentioned leading lights in line until opening out the first *fixed* white light at the entrance to the narrows, which light can be passed at the distance of about one-third of a cable, two other *fixed* white lights to the southward will then become visible. Pass the second light at the distance of about one-third of a cable, and proceed until passing the bar buoys, when a course can be steered for the third light, which pass at the distance of a quarter of a cable. These three lights should be left on the starboard hand entering.

The mariner, after passing the third light, must be guided by the buoys marking the narrow channel, two more lights which mark the upper reaches near the wharves, must also be left on the starboard hand.

GENERAL DIRECTIONS for SPENCER GULF.—Large vessels bound for Spencer gulf from the westward, are advised to keep South of Neptune isles; after which Wedge isle may be passed on either side, taking care to clear Foul ground south-eastward of it, and the other dangers near the Gambier group. From about midway between West cape and Wedge isle, a N. by E. ½ E. course for about 100 miles will lead to nearly midway between Middle bank and the western shore, passing 7 miles westward of Webb rock and Tipara reef.

From about mid-channel, on the west side of Middle bank, to Lowly point, the fairway course up or down is N.N.E. or S.S.W., in 6 to 12 fathoms, 7 miles off the western shore below Plank point; but vessels generally keep more over towards that shore; passing eastward of the red and black beacon buoy on the 4-fathoms shoal lying in about mid-channel, 10 miles westward of Jarrold point; and when in the vicinity of the Western shoal it will be cleared to the eastward, in 3 fathoms, by keeping Hummock hill to the westward of North. When in sight of Lowly point, mount Brown kept over the point, bearing N. by E. ½ E., leads up the gulf in 10 and 8 fathoms between Eastern shoal and Fairway bank.

A vessel leaving Wallaroo bay for port Augusta may pass on either side of Middle bank, but the west side is to be preferred.

For Tipara and Wallaroo Bays.—If bound to Tipara or Wallaroo, steer N. by E. ½ E. only so far as to arrive at about 8 miles westward of cape Elizabeth, and then proceed as directed at page 153.

In Entering Spencer Gulf from Investigator Strait, large vessels should pass south of Althorpe isles, and having rounded the south isle, it should not be brought southward of E.S.E. until the islets about Pondalowie bay open west of West cape, or until the cape bears N. by E., which will lead one mile outside of S.W. rock and Emmes reef, in 19 fathoms. Small vessels generally pass between the northernmost Althorpe isle and cape Spencer; or from midway between the south and east isles, a N.W. ½ W. course will lead three-quarters of a mile North of Emmes reef, and one mile off the reefs of Reef head.

At Night, a vessel entering Spencer gulf should bring cape Borda light to bear South before hauling northward into Spencer gulf, and then run up North, between Wedge isle and Yorke peninsula.

TIDES.—The flood stream divides off cape Spencer, one branch setting along shore, E.N.E., and the other to the northward.

DIRECTIONS for the WEST COAST.—In the winter months, if bound up Spencer gulf to port Augusta, and when near Althorpe isles (or between them and Thistle island), there is a north-easterly or northerly wind with a falling barometer. It will eventually prove of great advantage to get over on the west side of the gulf, as the wind sooner or later will shift to N.W., and a vessel near the west coast has then a fair wind to Shoalwater point. No one, however, unacquainted with the rocks and islets north of Thistle island should attempt to do so until north of Sir Joseph Banks group.

From Port Lincoln to Lowly Point.—From near Boston point to midway between Bolingbroke point and Kirkby island the course is N.E. by E. 12 miles; with the flood tide a more easterly course will be necessary to avoid being set on to the rocky ground south of Bolingbroke point. From thence N.N.E. 5 miles until the north island of Sir Joseph Banks group bears East, and then a course of N.E. ½ E. for 75 miles, will take a vessel to midway between Shoalwater point and Tickera bay. The last course passes 14 miles N.W. of the Tipara reef lighthouse. If the light is kept in sight until it bears South, a course of N. by E. ½ E. from there will lead up the fair way of the gulf to the westward of the Middle bank; thence proceed as previously directed.

Caution.—If between Sir Joseph Banks group and Shoalwater point a vessel has the whole of the flood tide, she will be set considerably to the northward of her course, and may get too close to the banks between Franklin harbour and Shoalwater point. Frequent sounding is the best guide to rely on, both by day and night, and while off that part of the coast a vessel should not shoal her water to less than 8 fathoms, or haul to the southward immediately she does so.

In the summer, after very hot days, the Tipara light may be so much elevated by mirage, that it being in sight cannot ensure a vessel being in safety, although in ordinary cool weather it would not be visible if passing too near Shoalwater point.

With a strong wind blowing up or down Spencer gulf, the water always gets much smoother at the edge of the banks, and in working either way the lead is the best guide for tacking.

Winds on West Coast.—During the winter months from May to December the winds are the same as those described elsewhere for the east coast and port Augusta. In the summer, hot winds are not nearly so prevalent as in those places, seldom lasting 12 hours, and always succeeded by the cool S.S.E. wind, which, although occasionally interrupted by a moderate westerly gale, blows with tolerable regularity, being fresh in the afternoon, and dying away before midnight, to come up again at 8 or 9 o'clock the next morning.

Pilots.—It has hitherto been the custom for vessels bound to port Augusta to proceed first to port Adelaide, and there pick up a pilot for Spencer gulf and port Augusta. Strangers now generally employ one of the pilots from the cutters which cruise off Lowly point. Outward-bound vessels frequently leave their pilots at Wedge isle, in the entrance of the gulf.

Tugs can be procured at port Adelaide. The steam vessel which trades to port Augusta frequently tows vessels up or down, through the estuary on her trips backwards and forwards.

NORTHERN PART OF SPENCER GULF, OR ESTUARY OF PORT AUGUSTA.*

This estuary extends from its entrance between Lowly point and Ward point, nearly N. by W. 32 miles to port Augusta, and from thence about 4 miles farther to the head of the gulf, gradually contracting from 8 miles in width, at the entrance, to a quarter of a mile above port Augusta.

The soundings taken in 1873 show that the upper part of the gulf is slowly silting up, but a channel could easily be dredged to admit the largest vessels.

Flinders range, on the east side of the estuary, has some remarkable peaks; mount Remarkable, N.E. ¾ E. 22 miles from Lowly point, being 3,130 feet, and mount Brown, N.N.W. ½ W. 19 miles from mount Remarkable, being 3,174 feet high.

Caution.—Vessels running up for Lowly point from the S.W., have sometimes mistaken False bay for the entrance of the estuary, which does not show till close up to Lowly point; but by day mount Brown can almost always be seen, and when it bears N. by E. ½ E. Lowly point is directly in line with it; and by night the light on Lowly point will be a sufficient guide.

The WESTERN COAST.—LOWLY POINT is a long low projection, with a high sandy beach on its southern side, and gradually rising land at about half a mile to the westward. Although Lowly point is steep-to, a large vessel should give it a berth of not less than half a mile, to avoid Lowly point shoal, to the northward.

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* *See* Admiralty plan of port Augusta, No. 401; scale, m = 1 inch.

LIGHT.—A lighthouse, two cottages, and a store have been erected on Lowly point, all of which are painted white. A *revolving* white light, showing *a bright flash every ten seconds*, is exhibited from an elevation of 57 feet, which is visible in clear weather from a distance of 10 miles.

Lowly Point Shoal, N.N.E. three-quarters of a mile from Lowly point, is a bank of hard sand and rock, 400 yards long, North and South, and 200 yards broad, the least depth on it being 2¼ fathoms.

The shoal is marked by a perch buoy.

BACKY BAY.—From Lowly point nearly a straight coast extends N.N.W. 5¾ miles to the head of the bay; it is formed of low whitish cliffs and stony beaches, with mangroves after the first 3 miles. Between one and 4 miles from Lowly point the coast rises to a ridge of hills, attaining an elevation of 328 feet. From the head of the bay, behind which is a salt swamp, the northern shore trends E. ½ S. 2 miles to Backy point.

The shore from Lowly point to within one mile of the head of Backy bay may be approached to a quarter of a mile in 9 to 3½ fathoms; but a hard sand-flat, covered at high water, extends half a mile from the head of the bay, with shoal water a quarter of a mile farther out.

BACKY and CRAG POINTS.—The former is a bold, black rocky point, 178 feet high, which may be approached to one cable in 8 fathoms. From Backy point a bold, broken, rocky coast trends N. by E. ½ E. 1¼ miles to Crag point.

DOUGLAS POINT, N. ¾ E. 2½ miles from Crag point, is rocky, with a low black cliff, the intermediate coast forming two bays, with hard sand-flats which, at low water, dry out to the line of points, and are fronted by shoal water, of which the 3-fathoms edge extends half a mile from the sand-flats.

The COAST from Douglas point takes a general N. ½ W. direction 6¼ miles to Two Hummock point, and from 2½ miles northward of Douglas point to within half a mile of Two Hummock point it consists of thick mangroves, with low land behind, and is bordered nearly the whole distance by a hard sand-flat covered at half-tide, extending from a quarter to half a mile from the shore. The sand-flat is fronted by a narrow border of shoal water from Douglas point to Two Hummock spit, nearly one mile south-eastward of the southern extreme of Two Hummock point.

Douglas Hills are detached grassy ranges rising behind the coast between Crag and Two Hummock points, some of them being separated by rocky ravines. One of these hills, nearly N.W. 2 miles from Douglas point, has a cairn of stones 653 feet above high water.

About 2,500 sheep were depastured on these hills, the shepherd's stone hut and well being situated two thirds of a mile from the shore, at one mile northward of Douglas point. The well, which supplies about 240 gallons of very brackish water daily, is 120 feet deep, and is very conspicuous from having a heap of very white limestone round it, thrown up during the excavation.

Douglas Bank, the centre of which lies N. by E. 2⅔ miles from Douglas point, is about half a mile long, North and South, and 200 yards broad, with a depth of only 10 feet on it at low water; the shallowest water being on the west side of the bank, from whence it deepens suddenly to 6 and 8 fathoms; whilst on the east side and off the southern end of the bank the water gradually deepens to 6 fathoms at half a mile off.

Buoy.—There is a chequered red and black perch-buoy on the south end of the bank, from which Douglas point bears S. by W., distant 2½ miles.

There is a clear channel nearly three-quarters of a mile wide, with 5½ to 10 fathoms, between Douglas bank and the west shore; and on the east side there is a clear channel one mile wide, with 8 to 4 fathoms.

Clearing Marks.—Mount Gullet, a wooded hill 209 feet high, on the east shore, N.E. by E. ½ E. 6 miles from Douglas point bearing E. by N., clears the south end of Douglas Bank, in 5 fathoms, and the same hill bearing E. ½ S. clears the north end of the bank in 6 fathoms. Crag point in line with Douglas point, bearing S. ¾ W., just clears the west side of the bank in 7 fathoms; and Crag point in line with Backy point, bearing S. by W. ½ W., or the north extreme of Two Hummock point in line with the north end of Bluff range, bearing N.N.W. ¼ W., clears it, passing half a mile to the eastward.

Two Hummock Point is a low broad projection with alternate rock and sandy beach, having two hummocks covered with scrub; one on the point, and the other nearly three-quarters of a mile to the north-westward; the latter, which is the higher hill, is 94 feet above high water. There is a salt swamp extending from between these towards a third, or inshore hummock, which bears W.S.W., distant 1¼ miles from South hummock.

A Knoll.—A small knoll, with 3½ fathoms on it, lies N.E. by E. ½ E. two-thirds of a mile from the north extreme of Two Hummock point.

Two Hummock Spit.—From Two Hummock point the sand-flat dries out nearly half a mile, beyond which, Two Hummock spit, with 9 to 12 feet water on it, extends nearly one mile south-eastward from the south extreme of the point.

The edge of the spit is marked by two black buoys and a beacon.

THE EASTERN COAST from Ward point trends N. by W. ½ W. 9½ miles to a small salt creek, at nearly half a mile south-eastward of which is mount Mambray. For nearly the first 3 miles from Ward point there are thick mangroves, between which and the creek the coast consists of a low sandy beach, with a level country, covered with thick gum scrub behind it.

From the salt creek, the low coast extends nearly in a straight direction N. by W. 5½ miles to a point of thick mangroves on the southern side of Yatala harbour. For about one mile northward of the creek there is thick scrub, from whence a salt swamp, intersected by several creeks, extends to the southern side of Yatala harbour.

The coast from Ward point to Yatala harbour is bordered by a hard sand-flat, generally from three-quarters to one mile broad, which is covered at high water, and fronted by shoal water extending from one-third to three-quarters of a mile from the edge of the flat. At W. ¾ N. 2¾ miles from mount Gullet the sand-flat stretches out to a spit, on the north side of which a deep narrow creek, barred at its entrance, trends about 1½ miles north-eastward, into the flat. From the entrance of this creek the edge of the sand-flat curves in a N.W. ¾ N. direction 1¾ miles, and then trends nearly N. by E. 1½ miles to a spit, forming the south side of the entrance of Yatala harbour.

To the north-westward of the creek the shoal water which borders the sand-flat projects one mile south-westward, in the direction of Douglas bank; but between this projection and the entrance of the harbour, the shoal water does not extend beyond a quarter of a mile from the edge of the sand-flat.

Buoy.—A low cylindrical buoy with beacon on the top, painted red, is placed at the extremity of this projection in 17 feet at low water, with mount Grainger bearing N.N.E. ¼ E., and mount Gullet E. by S.

Mount Mambray is covered with thick scrub rising to the height of 111 feet, and bears N. by W. ¼ W. nearly 9 miles from Ward point, and East nearly 6 miles from Douglas point.

Mount Gullet, N. ¾ W. 3 miles from mount Mambray, is broad at the base, with a round flattish top, 209 feet high, and thickly covered with scrub. This and mount Mambray are the only conspicuous objects near the coast between Ward point and Yatala harbour.

YATALA HARBOUR.—From the point of thick mangroves on the south side of the harbour the mangrove shore trends eastward half a mile to Dowsett creek, and thence north-eastward one mile, and south-eastward about the same distance to the head of Yatala harbour, which trends S.E. one mile into a mangrove swamp, and is about two-thirds of a mile wide ; but this bight is so filled by a flat of sand, mud, and weeds, as only to leave a narrow channel leading into it, and which is barred at the entrance.

From the north side of the entrance of this bight the coast, which is backed by thick scrub, trends N.W. by W. 1¾ miles to a small jetty and hut, at one-third of a mile northward of which is mount Grainger, a round black-looking hill covered with bushes, which, from its rising to the height of 257 feet from low flat land, is a good mark for the entrance of Yatala harbour. The coast from the jetty turns north-westward round the foot of the mount to a small salt creek about one mile from the jetty. From the creek the coast extends W.N.W. 2¾ miles to Red Cliff point, midway between which and the creek, Red Cliff rises to the height of 60 feet, the land behind it being swampy.

The coast from mount Grainger to Red Cliff point is fronted by a sand-flat, covered at high water, extending from two-thirds of a mile to one mile from the shore. At W. by S. ½ S. 2 miles from the mount, an Oyster bank, awash at low water, springs, projects half a mile to the southward, and forms the north side of the entrance to Yatala harbour. Shoal water extends from three-quarters of a mile southward of the Oyster bank, to about one-third of a mile from the edge of the flat abreast of Red Cliff point.

The Anchorage, or navigable portion of Yatala harbour is now a mere basin of shallow water in the sand and mud-flats, which extend from half a mile to nearly 2 miles from the land, the nearest approach to the shore being to the south-westward of the jetty under mount Grainger ; and even here the sand and mud dry out more than half a mile, the tide seldom reaching to the end of the jetty.

The entrance, which is three-quarters of a mile wide, lies between the north extreme of the southern sand-flat and the Oyster bank before noticed. There are 4 to 3 fathoms water close to the south side of the entrance, between which and the Oyster bank the depth decreases from 9 to 1½ feet. The basin within the entrance is about 2 square miles in extent, with 6 to 15 feet water, and having the before-mentioned narrow deep channel leading eastward through the mud-flat to the head of the harbour ; but the channel, as before stated, is barred at the entrance. By comparing the soundings taken in former surveys with those obtained in 1863, Yatala harbour appears to be fast filling up.

DIRECTIONS.—Small vessels entering Yatala harbour should bring the Inshore hummock in line with the south extreme of Two Hummock point, bearing W. ½ S., till mount Grainger bears N.E., and then steer for it. To get into a position off the jetty, a vessel must pass over a 6-feet bank, at about half a mile within the entrance. There is a strong tide-ripple off the entrance, with southerly winds.

Middle Bank, the south-eastern end of which lies N.N.E. ½ E. 1½ miles from the north extreme of Two Hummock point, is a little more than three-quarters of a mile long N.N.W. and S.S.E., with an average breadth of 200 yards, the least water on it being 7 feet.

Buoys.—Each end of the bank is marked by a chequered buoy.

There is a clear channel nearly three-quarters of a mile wide on the west side ; and one on the east side half a mile wide, having 6 to 10 fathoms. The west and more direct channel is preferred.

Clearing Marks.—Inshore hummock open North of South hummock, bearing S.W. ¾ W., clears, in 4½ fathoms, the south-east end of Middle bank at the distance of one cable; or the Mangrove point 2¾ miles north-westward of Two Hummock point, in line with the north side of a deep ravine in Bluff range, bearing W.N.W., just clears the south-eastern end of the bank in 3½ fathoms.

Mount Brown, in line with the extreme of the mangroves on the north side of Red Cliff point, bearing N.E. by N., clears in 4 fathoms the north-western extreme of Middle bank at the distance of a cable. There are no clearing marks for the south-western side of the bank; but a passing vessel should not go into less than 8 fathoms.

WESTERN COAST.—From Two Hummock point the low mangrove shore trends N.W. nearly 3 miles to Mangrove point, and is bordered by a hard sand-flat extending from one-third of a mile off Two Hummock point, nearly N.W. by N. 4 miles, to the southern entrance of Blanche harbour. This entrance, which is one quarter of mile wide, with 4½ to 8 fathoms water, is bounded to the northward by the south-east extreme of West sands; from which a spit, marked by a black beacon, projects a quarter of a mile to the eastward.

West Sands, which uncover at low water, springs, form a bank 1⅓ miles long, N.W. by N. and S.E. by S., and half a mile to one quarter of a mile broad. Its north-eastern side may be passed within a quarter of a mile in 4 to 7 fathoms.

BLANCHE HARBOUR.—From Mangrove point the low mangrove shore of Blanche harbour trends westward 1¼ miles, and then turns northward to the west side of the northern entrance, nearly three-quarters of a mile westward of the north-west extreme of the West sands. There is an extensive salt swamp behind the southern shore of the harbour.

The shores are fronted by flats extending half a mile to a quarter of a mile from the mangroves, leaving a space of about 1½ square miles, with one to 2½ fathoms water. Blanche harbour has two entrances ; the southern entrance one-quarter of a mile wide, between the south-east extreme of West sands and the flat, extending one mile from Mangrove point; and the northern entrance, which has a channel carrying 6 to 4 fathoms nearly one mile in towards the harbour, between West sands and the mainland.

The COAST from the northern entrance of Blanche harbour extends N. ½ E. 4½ miles to Commissariat point, and mostly consists of rough stony beach, fringed with mangroves and fronted by a sand-flat, which at low water dries out nearly a quarter of a mile from the shore. The land behind this coast rises to the Bluff range, which at 1¼ miles southward of Commissariat point is only one mile from the shore.

Bluff Range.—The Bluff is the eastern and highest part of a long flat-topped range, rising near Lowly point and extending about N.N.W. 12 miles and then N. by E. nearly the same distance to the Bluff, on which a cairn of stones has been erected 948 feet above high water; but it is not easily distinguished from the scattered bushes on the summit, which is a few hundred feet broad, with a gradual slope to the westward. From the Bluff the range extends N.N.W. 4½ miles, when it turns to the westward, leaving a detached ridge at the angle, named the Sisters, which seen from the south-east, appears as two peaks, the south-eastern being 737 feet high.

Commissariat Point, which lies N.E. ½ N. 1¾ miles from the Bluff, is so slight a projection of the mangrove coast as only to be distinguished when well to the northward or southward of it. The sand dries out 100 yards from the mangroves, and a 2-fathoms bank extends 400 yards beyond the sand-flat.

Beacon.—A black beacon has been erected near the edge of the shoal off the point.

Buoy.—A black perch buoy is moored on a sand-spit between the above beacon, and the one to the northward. Vessels should keep well in mid-channel.

EASTERN SHORE.—From Red Cliff point a margin of thick mangroves curves round N.E. by N. and N.N.W. 3½ miles, and from thence a low shore, with swampy land behind it, trends N.W. ½ W. about the same distance to Paterson point.

Paterson Point is low, with a sandy beach and a large clump of mangroves immediately to the northward of it. Sand and mud-flats intersected by several navigable inlets, extend from this nearly across to the western shore at Commissariat point, to which side the gulf channel is confined.

FLINDERS CHANNEL trends nearly N.W. ½ N. 3¾ miles from Middle bank to the north-west end of West sands, and is from 1¼ miles wide at its lower end, to little more than half a mile wide at its upper, with 5 to 9 fathoms water.

Sand and Mud Flats.—At S.W. by W. and W.S.W. 1½ miles from Red Cliff point there are two small 4 and 4½ feet patches, from which a narrow intricate channel, carrying 1½ to 4½ fathoms water, penetrates above 2 miles north-eastward and northward into the sand and mud-flat, and terminates in a basin about half a mile in extent, with 1½ to 2½ fathoms water.

At three-quarters of a mile north-westward of this inlet is a small 4½ feet patch at the entrance of a narrow channel, carrying 2½ to 4½ fathoms, and leading nearly North 2 miles from Flinders channel into a sheet of water 2½ miles long, N.W. and S.E., and 1½ miles wide, with 1½ to 5 fathoms water, its nearest approach to the shore being distant half a mile, at 1¾ miles south-east of Paterson point.

East Sands.—From the narrow channel just noticed the south-west side of East sands extends N.W. ½ N. 2¾ miles, and has a narrow border of shoal water, nowhere more than 2 cables broad, except within half a mile of the spit forming the north-west extreme of the sands, from whence the shoal extends about half a mile to the southward, and a quarter of a mile to the westward; the western edge being marked by a red beacon, bearing N. by W. ½ W., distant nearly 2 miles from the black beacon on the south-east spit on the West sands. From the north-west spit of East sands the shoal continues nearly a mile to the northward, and has a mass of banks on it, partly uncovered at springs, with a red beacon at the north-west point, 7 cables N.N.W. from the red beacon just mentioned.

Between a half and one mile northward of the northern red beacon is a detached bank 300 yards broad, and uncovered at springs, having a narrow but deep channel leading round each end from Bluff reach into the sheet of water before mentioned. From Paterson point the hard sand-flat which fronts the shore extends S.W. 2 miles to a spit forming the south side of the entrance of port Paterson, which is nearly blocked up by a narrow bank, uncovered at springs, extending from 1½ miles S.S.E. of Commissariat point to one mile westward of Paterson point.

BLUFF REACH is a continuation of the gulf channel from Flinders channel to Commissariat point; it is bounded to the westward by the west coast, and to the eastward by the shoals extending from the north-west spit of East sands, the detached bank to the northward of them, by Paterson point spit, and the narrow detached bank in the entrance of port Paterson. The reach averages half a mile in width, but it carries 4 to 9 fathoms water. Vessels navigating in these waters should keep well in mid-channel.

WEST SHORE.—Curlew Point.—From Commissariat point the west shore extends N. by W. nearly 3 miles to a mass of thick mangroves, of which the south-eastern margin trends N.E. by N. one mile to Curlew point. This shore is bordered by a sand and mud-flat, covered at half tide, nowhere extending beyond a quarter of a mile from the shore, except within one mile of Curlew point, where the flat extends half a mile from the mangroves.

Beacon.—A black beacon has been erected on a projecting part of the flat at 1½ miles northward of Commissariat point.

Curlew Isle is merely a patch of mangroves on the flat projecting eastward from Curlew point, from which it is separated by a narrow channel dry at low water, and has a sandy knoll at its north end, which only covers at high water, springs.

The shoal extends one-third of a mile eastward from the centre of the island, and is marked at its outer edge by a black beacon.*

EAST SHORE.—Snapper Point, the north-west point of port Paterson, and the west extreme of a mass of thick mangroves projecting one mile south-westward from the high-water beach.

Port Paterson.—The low shores of this port from Paterson point trend irregularly N.N.E. 2¾ miles, and westward nearly the same distance to Snapper point. The gulf channel here narrows to barely three-quarters of a mile in width from mangrove to mangrove and assumes the appearance of a river between the dense mangrove flats on either side. The south-east shore of port Paterson is fringed with mangroves, and at 2 miles north-eastward of Paterson point is intersected by a creek branching into the swamp to the south-eastward.

The shores of port Paterson are fronted by sand and mud-flats generally extending about half a mile from the land, and covered at half-tide. From Snapper point a sand-flat, covered at half-tide, extends 2¾ miles southward, to the entrance of port Paterson, which lies S.E. two-thirds of a mile from Commissariat point.

The western bend of this flat is marked by a red beacon, bearing S.S.W., distant three-quarters of a mile from Snapper point.

A red perch buoy has been placed in 14 feet water on a spit formed at the south entrance to port Paterson.

The approach to the anchorage is by a channel 2 miles long, leading N.E. from the entrance, and is open to the gulf channel when the north end of the beach at Paterson point bears E. by N. At about two-thirds of a mile and 1½ miles within the entrance the deep water is confined to a width of one cable, with a depth of not less than 4 fathoms.

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* It is proposed to remove the shoal by dredging, so as to widen the channel to 250 feet.

The communication from the outer to the inner basin is by a narrow winding passage, about a quarter of a mile long. It has only 1¼ fathoms in the entrance at low water, springs, but within the channel the soundings in the inner basin increase to 2½ fathoms.

DIRECTIONS.—There are no marks to lead up the entrance of port Paterson, but the best time to enter is at low water, as the banks then show on either side; and if they are covered the different tide streams fill the channels with eddies, which gives the appearance of the whole being blocked up.

The Anchorage, or navigable part of port Paterson, is a sheet of water three-quarters of a mile in extent, with 3½ fathoms, mud, and has an inner basin half a mile in diameter, to the north-eastward, both being enclosed by the sand and mud-flats which mostly occupy the bight between Paterson and Snapper points.

The objection to port Paterson arises from the extent of the sand and mud-flats surrounding it on all sides, rendering communication with the shore difficult after half-ebb; besides which, the adjacent coast is a swamp, with the exception of the sandy beach to the northward of the inner basin, which is nearly half a mile from low-water mark.

Snapper Reach.—The continuation of the gulf channel from Bluff reach to Curlew isle is only 2 cables wide, with 3 fathoms water off Commissariat point; from thence Snapper reach trends N. by W. ¼ W. 2 miles, when the channel is again contracted from a quarter of a mile to 1½ cables in width, with 4 fathoms water, between the black and red beacons southwestward of Snapper point. From between these beacons the reach takes a general N.N.E. direction 2 miles, to abreast of Curlew isle.

A red buoy with staff and ball is moored on a 14 feet patch, at 1¼ cables from the eastern bank and 2 cables southward of Snapper point.

To the northward of Snapper point the channel shows at low water, springs, as the sands uncover, leaving a width of a quarter of a mile to less than one cable.

From Curlew point a margin of thick mangroves, forming the western shore, curves round westward and northward 2 miles to Brown point; and from half a mile eastward of Curlew isle the eastern shore, also consisting of mangroves, curves northward and westward 1½ miles to Orchard point, and from thence nearly N.N.E. one mile to abreast of Brown point.

Both shores are bordered by sand and mud-flats, and the land behind the mangroves is mostly overflowed at springs, the adjacent country at the back of these swamps not exceeding 70 or 80 feet in height. Nearly opposite Brown point there is a creek, on the north side of which a red bank covered with bushes, rises to an elevation of 77 feet.

The gulf channel from the black beacon off Curlew isle nearly follows the direction of the southern and western shores, and shows at low water, springs, when the sands are uncovered, leaving a passage a quarter of a mile to less than one cable wide; but there are some dangers which do not show at low water.

A bank, forming the south side of the narrows northward of Curlew point, extends 2 and 3 cables northward and westward from Curlew isle; it has very regular depths of 3 to 9 feet on it. Its northern edge, which extends 400 yards East and West, is marked by two black buoys.

Shoals and sand and mud-flats, having one to 2 fathoms water between them, extend nearly half a mile from the northern shore, their southern edge being defined by five red beacons; the first two standing on a 7-feet knoll, N.N.W. ½ W. and S.S.E. ½ E. 400 feet from each other, at E. by N. ½ N. and N.E. by E. ½ E. one-third of a mile from the north extreme of Curlew isle. The other three beacons, which stand respectively N.W. by W. ¾ W. 4 cables and W. by N. ½ N. two-thirds of a mile, and three-quarters of a mile from the southernmost of the first two, mark the southern edge of a sand and mud-spit projecting southward and eastward nearly one mile from Orchard point. There is a sand-knoll close to the northward of the fifth beacon, which covers only at high water, springs. The third and fourth beacons show the north, and the two black buoys the south side of the narrows, which are here only half a cable wide, but have 3½ to 4 fathoms water.

At S.W. 2 cables from Orchard point is the western edge of the spit extending from the point, and at half a cable south-westward of which is a 7-feet patch of hard sand covered with weeds.*

From the beacon last noticed, the edge of the flat which borders Orchard point trends N. by E. one-third of a mile, hence the gulf channel takes a general N. by E. ½ E. direction three-quarters of a mile to abreast of Brown point, with an average width of less than one cable, and depths of 2¼ to 3½ fathoms. The eastern side is rather steep-to, except opposite Brown point, where a spit projects 200 yards from the sand and mud-flat. On the west side, shoal water and the sand and mud-flat extend one-third of a mile from the mangroves, their outer edge being marked by four black beacons. The channel is nearly one cable wide, and carries 2½ to 3½ fathoms.

The main coast line from the southern extreme of the red bank opposite Brown point trends N.W. ½ N. 1⅔ miles to a projecting point, on which stands the flag-staff of Augusta. A sand and mud-flat, partly covered with mangroves, extends from 400 to 600 yards off the shore.

From the mangroves, which extend 400 feet from the flag-staff, the western edge of the sand and mud-flat fronting the shore trends South one-third of a mile, and from thence a narrow bank, partly uncovered at half-tide, extends in a S.E. by S. direction three-quarters of a mile to a spit, on which stands a red beacon at N.N.E. 2 cables from the extremity of the mangroves off Brown point.*

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* Entirely removed by dredging. There is now 18 feet at low water.—Annual report of South Australia Marine Board for 1883.

Between this bank and the flat which extends from the north-eastern shore there is an inlet one to 1¼ cables wide, extending three-quarters of a mile to the north-westward. In the entrance, which is on the east side of the spit-beacon, there are 3½ fathoms water, from whence the depth gradually decreases towards the head of the inlet.

The western shore from the extremity of the mangroves of Brown point curves round in a north-west and northerly direction 2½ miles to Camp point, and is lined with mangroves. Between the first 1¾ miles of this shore and the more elevated land behind there is a swamp a quarter of mile broad, overflowed at springs; this swamp, for the next three-quarters of a mile, does not exceed 150 yards in breadth.

The sand and mud-flat which borders this shore is not more than 100 yards broad, except at a black beacon, opposite the flag-staff, and between 2 and 4 cables southward of Camp point, where it extends more than 200 yards from the mangroves. From one cable northward of this beacon to Camp point the flat is fronted by a shelf, having 5 to 11 feet water on it, and forms a rocky spit, which projects nearly to the opposite side of the channel, at about half a mile southward of Camp point.

At S.S.W. 4½ cables from the flag-staff the edge of the sand and mud-flat is marked by a black beacon. And at S.W. ¼ S., 2½ cables length from the flag-staff, a 5-feet shelf, also marked by a black beacon, projects from the west side, leaving the channel half a cable wide. This shoal, on which the barque *Rangoon* grounded and sustained serious damage in 1861, is dangerous, from being composed of hard sand and stones. Between these two beacons a 9-feet spit shoals out for 150 yards from the west side, leaving a 2-fathoms channel less than one-third of a cable wide.

Artificial Channel.—From off Orchard point a channel 2,400 feet in length and 150 feet in breadth has been dredged to a depth of 18 feet at low water springs, and is marked on the west side by three black buoys, surmounted by staff and ball; and on the east side by two red buoys, surmounted by staff and ball. The gulf channel from Brown point to port Augusta, one mile in length, has also been deepened to 18 feet at low water ordinary springs, with a breadth of 150 feet; two cables length of the southern portion has been widened to 300 feet. The eastern side of the channel is marked by red beacons, and the western side by small cask buoys, painted black. Vessels proceeding to port Augusta should leave the red beacons on the starboard hand at a distance of from 75 to 100 feet.

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* In consequence of the improvement of the channel and alteration in the buoyage, the position of the beacons here mentioned must be used with caution.

There is now a clear channel of not less than 18 feet at low water springs up to port Augusta.

Anchorage.—The port reach, or anchorage of Augusta, extends from abreast of the flag-staff N.E. ½ N. nearly half a mile, and is one to 1½ cables wide, with 4½ to 2 fathoms water, having sufficient space for eight or ten large vessels to swing at moorings, in 18 to 20 feet water.

Moorings have been laid down between the bearings of N.W. and North from the flag-staff, for the use of vessels loading at port Augusta. To each buoy has been attached 12½ fathoms of 2¼-inch chain, secured respectively to screw moorings. Three sets of moorings have at low water, 15 feet; three have 18 feet, and two 22 feet. The part of the harbour between the three upper tiers of moorings is to be deepened to enable laden ships to always lie afloat.

At those out-ports where harbour-masters are stationed, or where pilots take charge of vessels, the direction and position of the mooring anchors and chains will be duly pointed out, and instructions given to masters of vessels in mooring and unmooring.

Masters and other persons in charge of vessels are required, when using the moorings laid down at the out-ports in the province of South Australia, to observe the following directions:—In fine weather, when there is little sea, a line may be made fast to the large buoy; but on no account must a vessel hang on to the buoy longer than is absolutely necessary to moor the vessel to the bridle, the buoy chains not being intended to moor by, but simply to show the positions of the moorings, and to facilitate picking up the mooring bridles.

In the event of the weather being such as would render it improper to take hold of the large buoy, the vessel must let go an anchor clear of the direction of the mooring chain on the bottom.

Having brought the vessel near the mooring-buoy, a little black wooden buoy will be seen, riding by a small chain attached to the mooring bridle, lying on the bottom. Having hauled up the small chain and brought the large link, or shackle to the hawse, shackle on the vessel's cable. Should an anchor be down, lift it, and, if necessary, shackle on the second chain; unshackle the small buoy, and veer cable as requisite; observing that, as the bridles are in short lengths, a vessel should ride with as much range as the locality or state of the weather would require were she riding at her own anchors.

In unmooring the small buoy chain must be secured before slipping, and the large buoy used under the same conditions as expressed in the first part of these regulations.

It will be obvious to masters of vessels that no confidence can be placed in securing vessels to the large buoys, when it is remembered that the constant friction of that portion of the chain touching the bottom so wears the stoutest chains, that very few months' wear shakes out the studs, rendering the chains quite unfit to hold on by, in any weather likely to cause a strain on them.

As every precaution is taken by the Marine Board to keep the moorings in a perfect state of efficiency, masters and others in charge of vessels will be held liable for all expenses in the event of the moorings being injured, in addition to penalties of not less than *5l.*, nor exceeding *20l.*

Augusta.—The township of Augusta is situated on the south-east side of the port, and from the flag-staff, which stands in front of the Collector of Customs' house, extends nearly quarter of a mile to the north-eastward. From the tolerably steep bank in front of the township the mangroves have been cleared away, and jetties have been run out; the jetty erected by the railway department is 596 feet long, with 19½ feet at low water at its outer end. Railways are laid on every jetty. There is also a jetty at Augusta West, 473 feet long, with 5 feet water at its outer end.

Port Augusta, at the head of Spencer gulf, is the northernmost and one of the most important ports of South Australia; it is the shipping place for the produce of a vast pastoral and mineral district lying to the northward, westward, and eastward. Every year adds to the number of copper mines opened.

In 1862 it only consisted of a few wooden houses, and two substantial stone and brick stores. The population of the town in 1881 numbered 757 persons. A weekly steam vessel plies between Adelaide and the intermediate ports. There is also rail communication with Adelaide *viâ* Terowie. A telegraph station connects Augusta with all parts of the Colony.

Supplies.—All kinds of dry goods can be obtained from the stores at Augusta, and fresh meat from Sterling, a township E.S.E. 4 miles from Augusta; but vegetables are not to be had, the surrounding country not being fit for cultivation.

Water.—The town is provided with waterworks, the tanks at Woolundunga holding 600,000 gallons. Water is laid on at one jetty. Firewood can be obtained in small quantities.

Fish may be caught in great quantities with hook and line, principally snapper. The best snapper ground is between Snapper and Curlew points and close off the north-west edge of the bank forming the narrows at Curlew point.

Trade.—The trade of port Augusta is chiefly in exports. After shearing time, from September to December, large vessels are constantly at this port loading wool or copper ore; the exports of copper, hides, and skins is considerable; in 1881, there were 214,771 bushels of wheat and 4,276 tons of flour sent to Great Britain; during 1881, 51 vessels of 17,160 tons entered, and 47 vessels of 18,760 tons departed. The gulf being very narrow at port Augusta, vessels lying in the stream receive cargo from both sides at the same time. The trade is increasing, as may be seen from the value of the exports for the years 1861 and 1875 respectively, the total value of exports in 1861 being 168,387*l.*, and in 1875 the value of wool exported was 383,911*l.*; and of copper 3,300*l.*, in addition to which a quantity was sent to Adelaide coastwise.

There being no slips nearly every iron ship is beached on the soft sand to clean the bottom, which is easily done owing to the rise and fall of tide.

TIDES.—It is high water, full and change, at port Augusta, at 8 h. 30 m.; rise at springs, 9 to 12 feet.

Sterling, E.S.E. 4 miles from Augusta, is a township containing in 1881, 368 inhabitants. The overland telegraph from port Darwin joins the other line to Adelaide at this point. In 1881 an abundance of good water was obtained by boring.

HEAD of SPENCER GULF.—From Augusta the low eastern mangrove shore curves northward two-thirds of a mile to the powder magazine. The sand and mud-flat which borders the shore extends about 100 yards from the mangroves to 200 yards abreast of the powder magazine, and has a narrow shelf of shoal water along it.

The gulf channel from Camp point winds to the northward, and is navigable for about 3 miles above port Augusta, through a narrow passage, which at about one mile north-westward of the point, passes close to the eastward of Flinders Red cliff, at one mile above which, in a N.N.E. direction, the channel is dry at low water; but the gulf, here reduced to a mere salt swamp, flooded at springs, extends about 25 miles to the northward from port Augusta.

Aspect.—The and immediately behind Augusta rises to the height of 73 feet, and Flinders Red cliff is 95 feet high, the latter being apparently the greatest elevation in this vicinity; most of the adjacent land is low, with bare mud-swamps, flooded at springs.

Flinders Range, on the east side of the upper part of Spencer gulf, appears to be almost a continuation of the high range—of which Barn hill, already mentioned, forms one of the summits—extending in a N. ½ W. direction from the head of the gulf of St. Vincent.

From 10 miles south-eastward of mount Ferguson, in Germein bay, Flinders range extends N. by W. ½ W., 48 miles to Devil's peak; the most conspicuous of the intermediate heights being mount Bluff, 6 miles eastward of mount Ferguson; mount Remarkable, North, 18 miles from mount Bluff; and mount Brown, N.N.W. ½ W. 19 miles from mount Remarkable. The first is 2,301 feet, the latter two are respectively 3,130 and 3,174 feet, and Devil's peak is 2,288 feet high.

From mount Brown other peaked mountains of considerable elevation, extend northward along the ridge of the same barren rocky range, when it terminates at mount Arden, beyond which nothing was visible from the sea. The ridge of Flinders range is distant 8 to 12 miles from the eastern shore between Ward point and Augusta point, the intermediate space being mostly low and swampy.

DIRECTIONS.—Beacons and buoys having been placed to show the channel to port Augusta, masters of vessels bound up the gulf will keep the black beacons and buoys to port, and the red to starboard. The beacons are placed in depths varying from 2 to 10 feet at low water, and care should be taken in approaching them, as many of them are close to the edge of steep banks. Middle banks are denoted by chequered buoys, which may be passed on either side. There is a chequered perch-buoy on Douglas bank, and there are small cask buoys from Two Hummock spit upwards.

From about half a mile eastward of Lowly point the best course will be N. ½ E. for about 12 miles, according to the tide stream, passing in 10 and 11 fathoms at 2 cables eastward of Lowly point shoal. This course will lead about one mile off Backy point, two-thirds of a mile off the shoal water projecting from the shore to the southward of Douglas point, and half a mile eastward of Douglas bank. From 10 fathoms off Lowly point shoal there are irregular soundings, in 6 to 12 fathoms, to Backy point, between which and Douglas point there are 12 to 10 fathoms, and from thence the depth of water gradually decreases to 6 fathoms eastward of Douglas bank.

After passing Douglas point, Backy point should be kept in sight, or in line with Crag point, bearing S. by W. ½ W., until the northern extreme of Bluff range comes on with the north extreme of Two Hummock point bearing N.N.W. ½ W., and then steer N. by W. till the north Hummock of Two Hummock point bears West. The next course will be N.W. ¾ N., to pass about a quarter of a mile westward of Middle bank, and through Flinders channel, between East and West sands, taking care not to get into less than 7 fathoms in the vicinity of Middle bank. The East and West sands, which are nearly one mile apart, generally show.

If, when in 10 or 9 fathoms at half a mile off Douglas point, it be desirable to pass westward of Douglas bank, where there is the deepest water, and the tide streams are strongest, steer N. by W. for the south Hummock on Two Hummock point, taking care to keep Crag point shut in by Douglas point, while mount Gullet bears between E. by N. and E. ½ S., and not going into less than 9 fathoms. When mount Gullet bears E. ½ S. haul out N. by E. till Inshore Hummock comes on with the south extreme of Two Hummock point, bearing W. ½ S., and steer N.W. ¾ N., passing westward of Middle bank and through Flinders channel, as just directed.

When the black beacon off Commissariat point bears North, or Red cliff is nearly in line with the foot of mount Grainger, bearing S.E. by E. ½ E., and the mangroves on the western shore distant half a mile, alter course to N. ¼ E. to pass through Bluff reach, having the red beacons on the starboard hand, gradually closing the western shore as Commissariat point is approached, and which should be passed at the distance of a quarter of a mile, until Commissariat point beacon bears S.W., or Paterson point bears E. ½ S. Just before rounding Commissariat point the depth of water decreases to 3 fathoms.

From about a quarter of a mile eastward of Commissariat point steer N. by W. ½ W. through the lower part of Snapper reach, leaving the black beacon on the port, and the red beacon on the starboard hand; and having cleared the spit projecting from the bank close to the northward of the red beacon, alter course to about N.N.E., keeping on the eastern side of the channel, and passing within 2 cables of Snapper point.

To the northward of Snapper point the gulf channel becomes so narrow that the enlarged plan of port Augusta will be a better guide than written directions for proceeding from Snapper point to port Augusta, which, since the channel has been improved and marked by beacons and buoys, is easy with a leading wind, without which no square-rigged vessel should proceed beyond Commissariat point.

The wind from S.S.W. round to E.S.E. is a leading wind through all the reaches in going up; and from N.N.E. to W.N.W. it is a leading wind in coming down.

Anchorage.—There is anchorage in any part of the estuary of port Augusta southward of Douglas bank, the best being in 6 fathoms, near the east coast, as the strength of the tide streams prevails most in the deep water along the west coast.

An anchorage in Backy bay has been recommended, with Lowly point bearing S. ½ E., distant 3 miles; but in winter, when strong north and west winds are frequent, more shelter may be obtained in 6 fathoms, sand, near the head of the bay, with Backy point bearing from N.E. to E.N.E., distant about one mile, when a vessel would be out of the tide.

In the strong winds from S.S.E. which prevail during the summer months, when port Augusta is most frequented, a vessel seeking anchorage for the night or a tide should, when within Lowly point, haul to the eastward and come to in 6 fathoms, under the lee of Ward spit.

TIDES.—The tides in the northern part of Spencer gulf are very irregular. At port Augusta, as already stated, it is high water, full and change, at 8 h. 30 m., and at Lowly point at 7 h. The rise at ordinary springs at the former place varies from 9 to 12 feet, and at the latter 6 to 8 feet; but after a strong hot wind, when it veers round to West and South, the tide at port Augusta has been known to rise 16 feet. During springs, strong North winds sometimes cause the water to fall one to 1½ feet lower than usual.

After full and change, the time of high water gets gradually later till the time of neaps, when it is high water between 10 h. and 11 h., both at port Augusta and Lowly point. Then a day occurs when the tide ebbs or flows twelve hours together, the whole tide often not ranging more than a few inches. After this the tides again become regular; but the time of high water has changed to between 5 h. and 6 h., and gradually return to the full and change times. It may thus be generally assumed that at port Augusta high water takes place in the morning and evening, and low water in the middle of the day. At night the tide is generally one or two feet higher than in the morning.

The stream generally sets fairly up and down the gulf channel, 1½ to 2 knots, and changes with the rise and fall, except about the mouths of the small channels through East sands, and to the southward of Douglas bank, where the flood sets N.W. across into the deep channel, the ebb setting out S.E.

Winds.—During the summer months strong winds from South and S.S.E. prevail; and in January, February, and March they are often interrupted by hot winds, which blow fiercely from the northward, sometimes for seven or eight days, raising the temperature to 120° in the shade. Commander Hutchison, during a hot wind in March 1862, experienced a maximum temperature of 109° in the shade. During the first eight days of that month the thermometer stood constantly over 90°, and for three days over 100°. The hot winds frequently terminate in a squall from the southward, or a thunderstorm from S.W. They blow under a cloudless sky, with a thick red haze.

Whirlwinds are common in summer ; but they are usually confined to the plain between Flinders range and the gulf, where several may be seen at once, raising pillars of dust to a great height.

Very little rain falls during the year, and the quantity in that period is very uncertain. The rain-fall observed at port Augusta during the years 1859, 1860 and 1861 was respectively 2·038, 9·160, and 7·186 inches.

During the months of April and May some strong northerly winds were experienced, with a hard, cold-looking sky; these winds, although coming from the same quarter as the hot winds, did not raise the temperature above 75° or 80°. During the winter months north-west to south-west winds generally prevail.

CHAPTER III.

AUSTRALIA.—SOUTH COAST, CAPE CATASTROPHE TO CAPE OTWAY; INCLUDING INVESTIGATOR STRAIT, THE GULF OF ST. VINCENT, AND KANGAROO ISLAND.

VARIATION IN 1884.

Cape Catastrophe - 3° 55′ E. | Cape Otway - 7° 40′ E.

INVESTIGATOR STRAIT,* the most direct channel between Spencer gulf and the gulf of St. Vincent, lies between the north coast of Kangaroo island, from cape Borda to point Marsden, and the south coast of Yorke peninsula, from cape Spencer to Troubridge point.

Investigator strait extends 52 miles E. by N. ¼ N. and W. by S. ¼ S., and is 23 miles wide. With the exception of the rocks in the vicinity of Althorpe isles and the shoal flat off Sandy point, the strait is free from dangers. From 45 fathoms, in the middle of the western entrance of Investigator strait, the depth decreases to 25 and 20 fathoms, after which it is irregular between 12 and 20 fathoms as far as the gulf of St. Vincent, the deepest water being on the south side; but there is no danger in any part to prevent a ship passing through the strait with perfect confidence. The bottom is mostly broken shells, mixed with sand, gravel, or coral, and appeared to hold well.

CAPE BORDA, the north-west point of Kangaroo island, and which forms the south-west side of the western entrance of Investigator strait, is a bold cliff headland, the cliffs being 200 feet high at the pitch of the point, but rising to over 400 feet 1¼ miles to the southward. At cape Borda the upper half of the cliff is whitish limestone and the lower half very dark volcanic stone. The hills at cape Borda rise above the cliff to a height of more than 500 feet, and are covered with small scrub. The cape should not be approached too closely, especially in light winds, when the swell might set a vessel too near the shore, on which the surf, in westerly winds, breaks with great violence.

Caution.—During flood tides there is a strong set into Spencer gulf, carrying vessels to the northward. Althorpe island light having been made before cape Borda light by vessels running for Investigator strait.

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* *See* Admiralty chart of Australia, South coast, gulfs of St. Vincent and Spencer, No. 2,389a; scale, $m = 0{\cdot}25$ of an inch.

Telegraphic communication is established with port Adelaide, and passing ships hoisting their number will be reported.

Rocket Apparatus.—In the event of a vessel being stranded at or near cape Borda, and the lives of the crew being in danger, assistance will, if possible, be rendered from the shore.

LIGHT.—The lighthouse on cape Borda exhibits at an elevation of 510 feet, a white and *red* light *alternately every half-minute;* the tower, which is square and painted white, is about 60 feet in height, and is built on the slope of the hill, one-third of a mile S.E. from the cape; the keepers' houses are close to it, and the hill rises above them. The light is visible from S.W. by S. round by south and east to N.E. by E. The white light may be seen 30 miles in ordinary weather, and the *red* light is visible 15 miles, but during the hot winds and calms of the summer months they may be seen much farther. When the *red* light is not visible the white light will appear at intervals of *one minute.*

During thick or hazy weather, or strong S.S.W. winds with rain, the light is occasionally partially obscured; in such weather great caution is necessary, the land between capes Bedout and Borda having been seen before sighting the light.

SOUTH COAST of Investigator Strait.—From cape Borda the north coast of Kangaroo island trends E.N.E. for 10 miles to cape Forbin, and is bold and cliffy between those points.

Landing.—Nearly 2½ miles East of cape Borda is a break, forming a small cove in the cliffs, called Harvey's Return; here all the stores for the lighthouse are landed in fine weather in the summer, on a small sandy beach, which washes away in winter, during which season there is sometimes nearly an interval of a month before any safe landing can be effected.

Cape Torrens, 7 miles E.N.E. of cape Borda, is a very high point, the cliff being 725 feet high, which divides the space between capes Forbin and Borda into two bights; in the western bight the cliffs continue high and level for nearly 4 miles, and in the eastern bight fall gradually to De Mole river, which is a small stream running into the sea over a little beach, three-quarters of a mile South of cape Forbin.

Cape Forbin is a rugged cliffy point, 176 feet high, from which the coast trends E. by N. ½ N. for 8 miles, East for 8 miles, and then curves round to cape Dutton, which is nearly E. by N. ½ N. 18 miles from cape Forbin. The whole of this coast is very rugged, broken, and cliffy, with several small coves and beaches on which landing can be effected, according to the direction of the wind.

Snug Cove, which is the second cove East of cape Forbin, and 3¼ miles from it, is the most sheltered, being only open to the N.W., and is partially protected by some rocks which run off a point to the westward of it. The beach does not show from seaward, but the cove may be known by a small peaked islet about 90 feet high, which lies close to the point of the cove, and by its being 1¼ miles to the westward of a high cliff, with some white marks near its summit.

Small coasters visit Snug cove, and lie in 6 to 9 feet water close to the beach on the north side, made fast head and stern. There is a house and some cultivated land in the gully which runs into Snug cove; it is the western inhabited spot on the island, except cape Borda lighthouse. Snug cove is about 300 yards long and 150 broad, with 2 to 5 fathoms water in it.

Western River, 6 miles East of Snug cove, is a small stream which runs into a cove (with a sandy beach) about 300 yards deep, and 150 yards wide; open to the northward, and with 4 fathoms water in its centre.

The COAST.—Between Snug cove and Western river is a range of high cliffs nearly level; the highest part, 733 feet above high water, rising to 877 feet at 1¼ miles inland, is 2¼ miles to the westward of Western river. The next beach, 5 miles to the eastward of Western river, is known as "Snellings," which faces to the north-west, and is a quarter of a mile in length. The cliffs about Snellings beach are much lower than to the westward, with a range of wooded hills rising behind them, giving this part of the island a more pleasant appearance than that hitherto described. The Middle river flows into the sea through Snellings beach in winter, and is navigable for boats for a short distance; in the summer its mouth is blocked up with sand and weed. The coast line between Snellings beach and cape Dutton is formed of broken cliffs of moderate height, with small patches of beach between, and no dangers more than 2 cables off shore.

Anchorage.—There is anchorage for coasters with southerly winds in 3 fathoms water, about a cable from the beach; and in 7 fathoms half a mile off, but the bottom is rocky at the latter depth. Vessels anchoring off Snellings beach should give the north-east point of the beach a berth of a quarter of a mile to avoid a reef which runs off the point to the northward, on which the sea generally breaks.

Cape Dutton is a sloping cliffy point nearly 200 feet high; a sunken reef runs off N.E. by E., nearly a quarter of a mile from the cape, with 10 fathoms water outside. There is sometimes a tide race off the cape, which in blowing weather looks like a break.

Cape Cassini, nearly E.N.E. 9 miles from cape Dutton, is 127 feet high, and formed of quite white limestone.

The COAST immediately to the westward of cape Cassini rises to high broken cliffs, and the same kind of coast continues to cape Dutton, forming several small coves, which, however, are all open to the northward and westward.

Stokes Bay.—The largest cove, 3 miles East of cape Dutton, is called Stokes bay, and coasters occasionally anchor there with south-easterly winds, in from 4 to 7 fathoms water, rocky bottom, 2 cables off the beach.

MOUNT MACDONNELL, the highest land on the north side of Kangaroo island, lies S. by W. 2½ miles from cape Cassini, it is a round-topped hill, 984 feet high.

The land at the back of cape Cassini rises gradually, forming a range of scrub-covered hills between 700 and 800 feet high.

Soundings.—The coast from cape Borda to cape Cassini is very bold and steep-to. Between capes Borda and Forbin there are 20 to 30 fathoms water at half a mile off shore, and between the latter and cape Dutton 25 to 15 fathoms at the same distance off, with rather shallower water off Snellings beach.

The COAST.—From cape Cassini the coast trends E. ½ N. 9 miles to cape D'Estaing.

For 1½ miles eastward of cape Cassini the shore is low and rocky, with a rocky ledge running out nearly 200 yards from the coast. East 1½ miles from cape Cassini a reef, nearly awash, extends a quarter of a mile off shore.

The coast then rises in high dark cliffs for nearly 4 miles, broken by the small sandy beach of Dashwood bay, which is a slight indentation 3½ miles to the eastward of cape Cassini.

Anchorage.—In Dashwood bay there is anchorage in 5 fathoms water, sand, a quarter of a mile off the beach.

Smith Bay is shallow, with a black boulder beach 1½ miles in length. The shore behind is low and rises gradually to the southward to Freestone hill, 563 feet high, flat-topped, and wooded in clumps. There is anchorage with off shore winds in Smith bay in 5½ fathoms, a quarter of a mile off the middle of the boulder beach, but the landing is bad.

The coast is a continuous cliff from the east end of Smith bay to cape D'Estaing, a distance of 2 miles.

There is a reef on which the sea generally breaks, 1½ miles West of cape D'Estaing; it extends a quarter of a mile off shore, with 6 to 9 fathoms water close outside it.

Cape D'Estaing, the western portion of Emu bay, is a cliff point about 50 feet high, with a whitish face to the northward. A ledge of rocks just awash at high water springs extends nearly half a mile to the northward of the cape, to which it is joined by shoal water.

Emu Bay is 3 miles broad East and West, and one mile deep; with 8 to 10 fathoms water in the centre, gradually shoaling towards the shore. The west side trends about S.E. for one mile from cape D'Estaing, and the bay then curves round into a fine sandy beach for 2½ miles.

Anchorage.—There is good anchorage in 5 fathoms water with the east rocky point of the bay in line with the extreme of White point beyond, bearing E.N.E.; and the highest sand-hill near the west end of the beach in line with the west end of Table-topped hill bearing S.S.W. Cape D'Estaing will then bear West. At this anchorage the beach would be three-quarters of a mile distant, but a small vessel would have smoother water by anchoring a quarter of a mile from the west end of the beach, in 3 fathoms, with the cape bearing W.N.W., and end of beach S.W.

White Point is E. by N. ½ N. 5 miles from cape D'Estaing, with a white cliff face, and a narrow rocky ledge awash extending a quarter of a mile to the northward from it. The land to the westward rises in high dark cliffs as far as the east end of Emu bay. To the eastward of White point the land falls, and bights into a small bay 1½ miles in width and nearly half a mile deep, with 6 fathoms water in the centre, gradually shoaling towards the shore. There is a small sandy beach in the south-west corner of the bay; the rest of its beach consists of boulders. Between White point and Emu bay the coast rises to the high wooded summit of mount Marsden, a hill with a rounded top, 584 feet high.

NORTH COAST of Investigator Strait.—From cape Spencer the east coast of Yorke peninsula trends round E.N.E. into Marion bay, forming three small bays with cliffy and rocky points and low land between. The first point is 3½ miles E.N.E. of cape Spencer, bold and steep, to white high cliffs to the westward. About half-way between this point and cape Spencer a small rocky islet lies 2 cables off shore, with which it is connected by a reef from the last point.

Rhino Head, is a sloping cliffy head, N.E. by E. ½ E. 4½ miles from cape Spencer, with a remarkable pinnacle of rock on its extreme, and much resembles the head of a rhinoceros.

MARION BAY, the south point of the bay, is 1½ miles N.E. by N. from Rhino head; the point is low and cliffy, with sand-hills at the back, and a sunken reef running off about 200 yards to the south-eastward. From this point to the east point of Marion bay is E.N.E. 4½ miles, and the bay is a little more than a mile in depth.

Anchorage.—Marion bay has been used by coasters for a temporary anchorage, but it cannot be recommended, being very shoal, with a foul rocky bottom covered with weeds, which would soon choke any small anchor dragging a short distance. The surveying schooner rode out a strong westerly gale here, but afterwards heavy rollers set in from the southward, and the whole bay was a mass of breakers.

TIDES.—It is high water, full and change, in Marion bay, at 2 h. 5 m.; springs rise 4 feet.

Hillock Point.—The cliffs extend from the eastern point of Marion bay E. by S. 1½ miles, when the coast becomes sandy, trending S.E. by E. three-quarters of a mile to Hillock point, which is low and rocky, with a small hillock at its extreme. After S.W. gales the sea breaks heavily off this coast, and for more than half a mile from the shore the bottom is rocky and uneven; a sounding of 5 fathoms has been obtained a mile South of the point. From Hillock point the land trends East 1½ miles, then E.N.E. 2½ miles; it forms a small bay on the east side of Hillock point, 4 cables across, and then becomes cliffy and rugged, with low rocks in front, on which the sea breaks heavily.

Yorke Point, 180 feet above the sea, with a small islet off it close under the cliff, lies near the centre of this rugged coast. The water is deep off Yorke point, there being 8 fathoms within half a mile of the shore.

FOUL BAY.—About a mile E.N.E. from Yorke point the coast trends N.E. by E. for 8 miles, forming a shoal bay about 2 miles deep, and ending in a low sandy point; from the south-west point of the bay the coast is cliffy for a mile to the northward, after which the coast-line becomes a low sandy beach; the soundings in the western part of Foul bay decrease gradually towards the shore, there being 3 fathoms from one-half to a mile off, but at the head of the bay and towards the eastern horn, called Sandy point, the soundings become very irregular, with rocky patches of 2 to 3 fathoms, more than 1½ miles off shore. The southerly swell sets into Foul bay, but in fine weather there is no surf on the beach.

There is a good snapper fishing ground, in 11 fathoms water off the south-west point of the bay, with Yorke point bearing W. by N. 3 miles.

TIDES.—The flood stream sets N.N.E. 1½ miles an hour into Foul bay, and the ebb stream S.W.

Sandy Point, forming also the west extreme of Sturt bay, another large bay, is very low and not easily made out from the southward, being merely a point in the beach. At low water the sand dries for half a mile off the point, and a triangular-shaped shoal, separated from the point by a narrow channel with 5 and 6 fathoms in it, extends S.E. ½ E. for 3 miles, with less than 18 feet water; thence it trends E. by S. for one mile, with 3¾ fathoms on the outer edge, when the water deepens to 7 fathoms.

Sandy point shoal consists of light sand, with large patches of weed; it is 2 miles broad at the base, which lies towards the shore, and has a rocky patch, with only 10 feet water, on which the sea occasionally breaks, lying S.E. ½ E. 1½ miles from the point.

STURT BAY, 14¾ miles wide and 4 miles deep, lies between Sandy point and Troubridge hill, the hill bearing from Sandy point E. ½ N. The coast trends at first N.N.W. for half a mile, then rounds to the north-eastward and afterwards to E.S.E., being a sandy beach for 8½ miles as far as Gilbert point. The soundings in Sturt bay decrease regularly towards the shore, the 5-fathoms line being about a mile from the beach; within 3½ miles of Troubridge hill the depth increases, there being 7 fathoms within a quarter of a mile of the shore.

Gilbert Point has some sand-hills, 60 feet high, on its western part. Rocks having less than one fathom water on them extend 3 cables southward of the point, and there are 5 fathoms at half a mile in the same direction. A black buoy marks the extreme of the one-fathom line eastward of Gilbert point; at E. ½ N. nearly a cable distant from the black buoy, a chequered buoy marks the N.W. part of a rocky bank lying nearly in mid-channel, having only 5 to 6 feet water on it.

From Gilbert point a rocky bank, 20 to 40 feet high, trends to the N.E. for one mile to a point, having above it some sand-hills, the highest of which is 65 feet. From this point a reef awash at low water extends in a S.S.W. direction for 2 cables, and then for 2¾ cables farther with not more than one fathom on it, where a red buoy marks the eastern side of entrance to port Moorowie.

Port Moorowie is a coaster's port, immediately to the eastward of Gilbert point. The anchorage is a round pool, 2 cables in diameter, with 2 to 3 fathoms water in it, capable of holding 10 or 12 small vessels. As a general rule the port is not available for vessels drawing more than 10 feet water. A boat jetty 285 feet long is erected.

Directions.—Gilbert point should be kept to the northward of N.W. by W. until the red buoy bears east of north; then steer in between the red and chequered buoys, which are 1¾ cables apart, passing half a cable to the westward of the former; or bring the post office (the highest limestone house) to bear N. by W., steer for it on that bearing, and anchor 1½ cables N.N.W. from the red buoy in 20 feet, sand and mud, the holding ground being very good.

From the westward, keep more than half a mile off Gilbert point, until the post office bears N. by W., then proceed as before.

In going in a vessel will pass over a bar with 8 to 9 feet water, some distance outside the buoys. If obliged to wait outside for high water, anchor in 30 feet, with Gilbert point hill bearing N.W., and the sand-hill east of the township, N.E. by N.

TIDES.—It is high water full and change in port Moorowie at 3 h. 10 m., springs rise 6 feet. The tidal stream is scarcely felt inside the port; outside, in 10 fathoms, the flood sets to the eastward and ebb to the westward, following the direction of the coast-line at the rate of 1½ knots at springs.

From port Moorowie the shore is a sandy beach, trending E.S.E. for 2 miles, it then turns S.E. ½ E., becomes bold and cliffy, as far as Troubridge hill, with high sand-hills about 140 feet above the sea behind, and sandy beaches at the foot of the cliffs.

Cootes Hill is a grassy rise at the head of Sturt bay, about 7 miles N.E. ½ E. from Sandy point; although only 91 feet high, this hummock is conspicuous from its shape and the lowness of the land in the vicinity, which forms in salt swamps, extending inland nearly across to Hardwicke bay.

Anchorage.—Sturt bay affords good anchorage to the north-east of Sandy point in 5 fathoms water, with the point bearing S.W. one mile. Good holding ground, fine sandy clay. This anchorage gives shelter in all winds, from N.E. round by north and west to S.E. by S.; Sandy point shoal completely breaking the swell from the south-west. With the wind strong between S.E. and N.E. a short sea sets in, which is made more unpleasant by the set of the tide, the ebb setting South, and flood N.E. by N.

Directions.—Eastward of Marion bay, about 3 miles inland, the land rises to a level scrub-covered range nearly 300 feet high, which extends almost parallel to the shore to about the centre of Sturt bay, when it abruptly terminates, forming a well-defined shoulder 270 feet high. This shoulder bearing just westward of North will lead up into Sturt bay and eastward of the Sandy point shoal in 5 fathoms. Yorke point kept West clears the south end of Sandy point shoal in 8 or 9 fathoms water. In making for the anchorage it is advisable not to haul in for it until Sandy point is made out, bearing W.S.W.

Troubridge Hill, on the east point of Sturt bay, 103 feet above the sea, makes as an island from the westward. It presents a cliff face to the sea, but on the landward side is grassy and sloping.

TROUBRIDGE POINT is E. ½ N. 2 miles from Troubridge hill, the coast-line between being a low cliff, with no danger more than a cable from the shore, and may be approached within half a mile in 10 or 11 fathoms water. From this point the coast, a series of broken cliffs, trends N. by E. a mile; the cliffs are then succeeded by a Sandy beach running north-east for 5 miles, fringed by a flat of sand and rocks drying at low water, and extending from one-half to three-quarters of a mile off shore.

Hungry Point is a low point at the termination of this sand-flat; from it the beach trends N.W. by W. for a mile to some low cliffs which trend northward and form the rounding De Mole point. A fishery is established at Hungry point. The coast-line then runs N. by E., North, and N.W. ½ N. to the entrance of Salt creek.

Edithburg.—On De Mole point, Edithburg jetty, having a crane on it, and 12 feet at its outer end at low water, has been erected for the shipment of Troubridge area produce. Edithburg is a watering place, with a population in 1881 of 234 people. There is a telegraph station here. Steam communication is established with port Adelaide twice a week.

LIGHT.—From the outer extremity of the jetty, a *fixed* white light is exhibited, which is visible in clear weather for 5 miles.

Salt Creek, which is 4 miles from Hungry point, is dry at low water, being merely a channel for the sea to flow into a salt lagoon at high water, but the bay at its mouth serves as the landing place for the stores, &c., brought by coasters from Adelaide for the sheep stations in this part of the peninsula. This bay is 2 miles across from De Mole point and nearly 1½ miles deep, but the greater portion of this space is a sand and mud-flat drying at low water springs, and in no part of the bay inside the line from point to point is there more than 6 feet water.

Giles Point, forming the north extreme of this bay, is a rounding point, low and grassy to the southward and cliffy to the northward, the end of the cliff lying N. ¼ W. 4½ miles from Hungry point, and N.W. ½ N. 5½ miles from Troubridge lighthouse; a rocky ledge dries about 200 yards from the point, and shoal water extends over half and three-quarters of a mile to the eastward and south-eastward respectively.

TROUBRIDGE SHOALS* extend nearly 4 miles eastward from Hungry point, and consist of three large sand-banks, which dry in patches at low water springs, and a reef of rocks, lying about three-quarters of a mile to the southward of the sand-banks. The eastern and outer shoal is nearly 1¾ miles long N.W. by N. and S.E. by S., and three-quarters of a mile broad in its widest part, with a small sandy island on it, 600 yards long and 100 feet wide, lying parallel to, and about 3 cables from, the eastern edge of the bank. On the south end of this islet, which is 15 feet above high water, and covered with bushes, stands the lighthouse.

The western and inner shoal lies W.N.W. and E.S.E., 2¼ miles long, by little more than a mile broad, separated from Hungry point by a narrow channel, with only 7 feet water between the rocky patches at its southern entrance, on which the sea breaks with southerly winds. A semicircular reef, known as the Sultana reef, which dries at half tide, lies near the eastern, and there is a solitary rock on the western, end of the bank. The third shoal is a small bank of a similar nature, lying between and to the south and eastward of the other two.

Marion Reef, a rocky ledge nearly a mile long, having in some places not more than 6 feet water over the rocks, lying East and West, about three-quarters of a mile southward of the sand-banks, its centre bearing S. by W. about 2¼ miles from the lighthouse. One mile southward of these rocks the water deepens to 8 or 9 fathoms, inside which the bottom is rocky. The sea does not break in fine weather on Marion reef, or on the south side of these shoals.

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* *See* Admiralty plan, Macdonnel sound, No. 2,152; scale, $m = 1 \cdot 5$ inch.

LIGHT.—The lighthouse on the Troubridge shoals shows, at an elevation of 80 feet above high water, *a revolving* white light, *every half minute*, and should be seen in clear weather from a distance of 14 miles. When within a distance of about 7 miles, a continued faint light will be seen in clear weather, between the intervals of the brighter light. The tower is iron, striped red and white horizontally, with a white top, and rises from the keeper's dwelling. Seamen should not, however, estimate their distance from the time of their first making the light, as, owing to refraction, it is often seen from distances when the lantern is considerably below the line of the natural horizon.

The Inner Channel, between Troubridge shoals and the mainland, passes close to Hungry point, where it is only about one cable wide; but it may be found useful to coasters, to save them from going round the shoals.

There is said to be shoal water on rocky patches, at least 3 miles to the southward and south-westward of the lighthouse.

TIDES.—It is high water, full and change, at Hungry point, Troubridge, at 4 h. 18 m.; springs rise 7 feet, and neaps 4 to 6 feet. An investigation of the observations made between 17th of February and the middle of April, shewed that the afternoon tides were the highest from the second or third day after full and change until the irregular tides had passed, when they became the lowest. From observations made at Kooley Wurta, 30 miles to the northward, in the months of August and September, it is probable that during the winter months the reverse of this may be found to be the case. At the Troubridge shoals the tidal stream turns about 45 minutes before high or low-water by the shore. The tide flows close round Hungry point between 3 and 4 knots at springs, the flood coming from the southward.

Tapley Shoal, a bank of from 3 to 5 fathoms over sand and weed, extends N. by E. for 5 miles, nearly a mile wide at its south end, but only a quarter of a mile wide near the north end. On the east side of this shoal the water deepens quickly to 9 and 10 fathoms, and the south end bears E. by N. 3½ miles from Troubridge lighthouse.

Tapley shoal offers no impediment in proceeding up the gulf of St. Vincent; but to vessels bound down, meeting unsteady winds, and trying to keep the weather shore aboard, it will be found to be directly in their track, and should be carefully avoided by deeply-laden vessels.* *See* page 198.

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* The bottom in fine weather can be easily seen. It is reported that as little as 16 feet water has been found on the shoal, and owing to the rapidity of the tide streams the effect on the sandy bottom may be to either reduce or increase the depth in some places.

MACDONNELL SOUND lies between Troubridge and Tapley shoals and the land, the general depth of water being from 5 to 8 fathoms.

Anchorage.—The best in Macdonnell sound is in 5 to 7 fathoms, fine sand, with the lighthouse bearing South to S.E. 2 to 3 miles.

Wool Bay.—Coasters lie about half a mile off in 2 fathoms. Large vessels further out in 6 fathoms, with the north end of the beach W. by N. and Giles point S. by W. ½ W. *See* page 238.

Vessels bound down the gulf of St. Vincent against strong south or south-west gales, are strongly recommended to avail themselves of the anchorage in Macdonnell sound, as it is almost impossible for a deeply-laden vessel to contend against the strong tide streams, which, from the direction of the winds act more adversely than favourably for a vessel working to windward.

DIRECTIONS for Investigator Strait and Troubridge Shoals.—The fairway course up Investigator strait from a position 10 miles North of cape Borda lighthouse is E.N.E., this course passing south of Althorpe islands about 9 miles, and the same distance south of Troubridge hill and the lighthouse on the shoals. It is as well, however, to give the north side of the strait a wide berth, the coast of Kangaroo island having no off shore danger, and being very high and bold. If obliged to stand over towards Yorke peninsula, do not go into less than 13 fathoms, or when Yorke point is in sight do not bring it to the southward of West. After passing to the eastward of Troubridge hill, do not bring the hill southward of West until the lighthouse is well to the westward.

It is recommended that bearings should be taken in Investigator strait as often as possible to fix the position of the vessel, which should not be to the northward of mid-channel; she will then be in the fairway. If the vessel gets too near the north side of the strait, the soundings varying but little, will not give timely notice of nearing the shoals.

From 9 miles South of Troubridge lighthouse a N.E. course leads to the Semaphore jetty at Adelaide, but the tide must be allowed for. On approaching the east side of the gulf a bearing of mount Lofty will be useful.

A vessel intending to run in to Macdonnell sound from the westward should keep Troubridge hill to the northward of West till Troubridge lighthouse bears North, then steer N.N.E. till it bears N.W., then North till it bears S.W., when a W. by N. course will lead to the anchorage, taking care on these courses not to go into less than 4½ or 5 fathoms. Due allowance must be made for the tide, which sets round the shoals at a rate of 2 to 3 knots at springs. South of the lighthouse, the tidal streams run E.N.E. and W.S.W.; eastward of the lighthouse the streams run North and South.

Navigating-Lieutenant A. F. Gibbons, H.M.S. *Clio*, 1873, remarks: "On rounding Troubridge shoals during the flood, at springs, we were set towards the shoal at the rate of 2½ miles an hour."

Troubridge lighthouse ought not to be approached when to the southward within 3 miles, but East and North of it, vessels may come as near as 1¼ miles. To clear the south end of Tapley shoal keep the lighthouse to the northward of W. ½ S.

KANGAROO ISLAND, at the entrance of the gulf of St. Vincent, is 80 miles long East and West, and about 24 miles broad, resembling in shape the Malay cris or dagger, with its handle to the eastward. The land is of good elevation and well wooded.*

Kangaroo island is thinly inhabited, the population in 1874, was from 500 to 600, farmers, wallaby hunters, &c. The former are located mostly about the eastern part of the island, at Antechamber bay, Eastern cove, Hog bay, and Kingscote. They are a very orderly and healthy community.

There is a scattered population settled along the banks of the "Three Well," or Cygnet river, and some land has lately been taken up for agricultural purposes along the course of Hog bay river, on the south coast.

There are settlers at Emu, Smith, Dashwood, and Stokes bays, and the barley fields at Snellings beach were conspicuous marks from the sea during the survey. There are also settlers at Snug cove, at D'Estree and Vivonne bays.

Barley is the staple produce of the island, which grows the best in South Australia.

The island is well watered, but from Kingscote, westward, is mostly covered with thick scrub, and unfit for either sheep or wheat farming.

The COAST.—Between cape Borda and West bay the coast is composed of dark limestone cliffs from 200 to 400 feet high, having many caves, into which the sea runs a short distance. The Ravine de Casoars is a break in the cliffs 2½ miles South from cape Borda; scrub-covered hills rise to a height of 500 to 600 feet behind the cliffs. There are 12 fathoms one mile off shore for 2 miles South from cape Borda, and 17 to 25 fathoms the same distance off from the Ravine de Casoars to West bay. With a heavy westerly swell there are rollers off the Ravine de Casoars to the distance of one mile.†

This part of the coast should be carefully avoided, particularly during light winds, when the ocean swell rolls in with considerable velocity.

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* The first ships with emigrants from Great Britain reached this island in July 1836 and after a little delay removed to Adelaide.

† The ravine was easily made out at 10 or 12 miles distance. Staff Commander W. H. Bradley, H.M.S. *Galatea*, 1867.

West Bay, the north point of which is S. by W. 8¼ miles from cape Borda, is three-quarters of a mile across at its entrance, and the same in depth; with soundings gradually decreasing from 10 fathoms at the entrance, to 4 fathoms 2 cables from the sandy beach at its head. Its northern and southern shores are cliffy, with rocks running off a short distance, and there is a low islet, the western extreme of which is 3 cables from the south point of the bay, having 5 to 9 fathoms within 2 cables of it. Small vessels sealing on this coast sometimes anchor in West bay; the heavy swell which comes in with a westerly wind renders this a risky proceeding, unless the wind is likely to continue off shore.

There is landing at the north end of the beach in West bay, when the wind is off shore; in 1873 there was only one settler, trapping wallabies.

Cape Bedout, S.E. 3¾ miles from the south point of West bay, is a round point, with a scrubby hill at the back about 300 feet high, and a little islet one cable off its extreme. South of West bay the cliffs and land behind are much lower than north of it. Between West bay and cape Bedout there are 10 fathoms water half a mile off shore, and 14 fathoms 4 cables off cape Bedout. In a heavy swell there are rollers in from 16 to 13 fathoms one mile South of cape Bedout.

CAPE COUËDIE, the south-west point of Kangaroo island, and S.E. 9½ miles from cape Bedout, is a narrow promontory one mile in length and three-quarters of a mile broad; facing to the S.W. it slopes down gradually to the sea on that side, but its northern and southern shores are steep cliffs.

The COAST.—S.E. rather more than one mile from cape Bedout is a low sloping point, the coast between forming a bight half a mile in depth, with a sandy beach at its head. From this point the coast trends E. by N. ½ N. 1½ miles to a sandy beach, and then E. by S. ¼ S. 1½ miles to the mouth of Rocky river; the coast line being low cliffs, with scrub-covered hills behind it, from 100 to 150 feet high. From Rocky river to the inner part of cape Couëdie, the coast trends S.E. by S. 6 miles, curving slightly, and forming Maupertuis bay.

Half a mile South of Rocky river is a conspicuous bare sand-patch, three quarters of a mile in extent North and South, and sloping down to the sea from sand-hills about 300 feet high.

To the S.E. of this the cliffs rise to within a mile of cape Couëdie, where they are 470 feet high. The hills inland are highest about 3 miles North of the cape, where a range partially wooded, extends E.N.E. 3½ miles from the coast. The summit of the range is 715 high, and N. ¼ E. 3½ miles from the centre of cape Couëdie. Between cape Bedout and cape Couëdie there are 16 to 21 fathoms water one mile off shore.

Soundings.—Due West of cape Borda there are 50 fathoms, 1½ miles off shore; off West bay it is 3½ miles out to 50 fathoms; off cape Bedout, there are less than 50 fathoms for 8 miles to the S.W.; and it is nearly 11 miles W.S.W. of cape Couëdie before 50 fathoms are found, the depth there being more than 40 fathoms to within 3 miles of the shore.

CURRENTS and TIDES.—The ocean current from the westward splits at cape Couëdie and runs to the northward along the west shore of Kangaroo island, considerably augmenting the flood tide, and at times quite overcoming the ebb, which runs to the southward.

Casuarina Islets are two in number, and lie S.S.W. ½ W. and S. by W. ½ W., nearly a quarter and 1½ miles respectively, from the south point of cape Couëdie. The one nearest the cape is 95 feet high, about half a mile in circumference, and composed of large bare rocks. It is surrounded by rocks which uncover at low water; a ledge runs off 400 yards to the S.E.

The farther islet from the cape is 115 feet high, 400 yards long W.N.W. and E.S.E., and 100 yards broad; similar to the other islet, except that the rocks which uncover extend farthest off one cable, from its north-west point.

There are 16 to 22 fathoms water on a rocky bottom between the islets; and the outer one has more than 20 fathoms, half a mile off anywhere to seaward, excepting at one mile S.W. from it, where there are only 13 fathoms.

There is a heavy tide rip S.W. from the outer islet.

Lipson Reef is S.E. by E. ¾ E. 8 miles from the outer Casuarina islet. The portion above water is 10 feet high, and of very small extent; the extent of the broken water surrounding the reef is only 400 yards East and West, and 200 yards broad. There are nearly 40 fathoms water one mile from the rock; no soundings have been obtained S.W. of it, but there are apparently no dangers in that locality. The swell usually breaks with violence over the rock.

The COAST.—From the south point of cape Couëdie the coast trends to the N.E. for nearly 2 miles, being high steep cliffs with deep water close to; there is then a sandy beach, under a precipitous shore; the cliffs over the west end of the beach are 428 feet high. The beach extends to the eastward 1½ miles, to a sloping point about 250 feet above the sea, having on the top three remarkable boulders, the most elevated of which is nearly 100 feet high.

Between this point and the west point of Hanson bay, the coast bights in rather more than half a mile, and is composed of moderately high cliffs with three little sandy beaches in the north-west part of the bight. At

N.E. by E. ½ E. 6 cables from the west point of Hanson bay lies a rock about 50 feet high, and not 200 yards in extent.

Hanson Bay, the west point of which bears E.N.E. 5½ miles from the south point of cape Couëdie, is 4 miles across and one mile in depth with 11 to 19 fathoms water over a rocky bottom. It is quite open to the southward and S.W., and not available as an anchorage.

There are four sandy beaches in the north part of Hanson bay, with low land behind them. The west and east shores of the bay are cliffy, with hills behind rising to a height of about 300 feet.

Douglas Rock is E. ¾ S. 1¾ miles from the west point of Hanson bay; it is a pinnacle awash at low water, and there are not less than 14 fathoms water a quarter of a mile off all round. It does not always break. The highest part of cape Kersaint kept well open of cape Bouguer E. by N. ¼ N. clears it half a mile to the southward.

Cape Bouguer, the east point of Hanson bay, is E. by N. 10 miles from cape Couëdie; it is one mile broad East and West, and has three cliffy projections, with rocks stretching a short distance off them. Wooded hills rise to a height of 300 feet inland from it. N. ¼ E. 11½ miles from cape Bouguer is a conspicuous clump on the table land in the middle of Kangaroo island. This clump may be seen from the sea, off this part of the coast.

Between cape Couëdie and cape Bouguer there are 14 to 20 fathoms water, one mile from the shore, the latter depth being found at half a mile from cape Bouguer. As a south-west swell rolls in with great force upon this part of the island, an offing of at least a couple of miles should be kept until cape Kersaint bears North.

Cape Kersaint, E. ¾ N. a little more than 10¼ miles from cape Bouguer, is a bold cliffy headland, with a scrub-covered hill 318 feet high above it.

The COAST between capes Bouguer and Kersaint is formed of low cliffs and scrubby rises, nowhere more than 250 feet high, with no considerable indentation. N.E. by E. 2 miles from cape Bouguer is a remarkable sand-patch, close to the shore, at the top of the cliff. A covered reef extends 600 yards South from a point three-quarters of a mile East of the sand-patch. "Stun'sail"-boom river discharges itself over a sandy beach, 5 miles E.N.E. from cape Bouguer. There are more than 20 fathoms water one mile off shore, between capes Bouguer and Kersaint.

Ellen Point, the south extreme of Vivonne bay, is N.E. by N. a little more than 2¼ miles from a point E. by N. ¾ N. 1¼ miles from cape Kersaint. The latter point is faced by cliffs and rises to a height of 193 feet; there is a small bight between it and cape Kersaint with 9 to 10 fathoms water in it. There are 13 fathoms close to the south side of the point, and rocks extend more than 200 yards off its east side. From there the coast has two slight projections to Ellen point, the cliffs gradually decreasing in height. Ellen point is a grassy mound, 28 feet high, bordered by low rocks. There are 6 to 9 fathoms a quarter of a mile off shore between cape Kersaint and Ellen point.

N.W. Snare, E. ½ N. 3 miles from cape Kersaint, and S. by E. nearly 2½ miles from Ellen point, is a dangerous pinnacle rock, with 2 fathoms water on it, and 11 to 20 fathoms close to all round. It breaks heavily when there is much swell, but when the water is smooth, only occasionally. There is a good channel, 1½ miles wide, between it and the coast N.W. of it, and having 16 to 20 fathoms in it. Mount Mary open of Ellen point N.N.E. leads through this channel. When standing towards the rock from the westward, Ellen point should not be brought to bear to the westward of North; nor from the eastward, to the northward of N.N.W.

S.E. Snare, E. by S. ¼ S. 6¾ miles from cape Kersaint, S.E. by E. ¾ E. 4 miles from the N.W. Snare, and W. ½ S. 10 miles from cape Gantheaume, is also a dangerous pinnacle rock, with 3 fathoms water on it, and 14 to 20 fathoms close to all round. It does not break so frequently as the N.W. Snare, and a good look-out for it is necessary when in its vicinity. In moderate weather, a vessel may easily ascertain her position when near the rock, by bearings of cape Gantheaume or cape Kersaint, and mount Bloomfield, or the black hill over Nobby islet. In bad weather it breaks heavily.

Vivonne Bay is 1½ miles broad and one mile deep, North of Ellen point. It has a general depth of 4 to 9 fathoms water. Its shores are sandy, with low limestone cliff near Ellen point, and a small rocky point 6 cables N.W. of the point.

The mouths of Harriet and Mary rivers are at N.W. 8 cables and N. by E. ½ E. 1½ miles respectively from Ellen point. They drain a considerable area of country, but are only open after heavy rains or high tides. A deep pool just within the mouth of Harriet river abounds with fish.

Mount Mary and Mount Bloomfield.—Mount Mary is a round vegetated sand-hill, 224 feet high and 1½ miles inland, on the north bank of Mary river. Mount Bloomfield is a conical and barren sand-hill, 272 feet high, three-quarters of a mile inland, and N.E. 3 miles from Ellen point. These two summits are the most conspicuous landmarks about Vivonne bay.

Anchorage.—There is anchorage in Vivonne bay during northerly and westerly winds, with Ellen point bearing S.S.E. half a mile distant, and the rocky point in the bay bearing W.S.W., in 5 to 6 fathoms, sand.

The bay is quite open to the S.E., and although with the wind high from that quarter the water is smooth, there is not room to get under way if it increases in strength; and the sea soon comes in.

During the season for S.E. winds, from January to June, vessels seeking shelter are recommended to go to D'Estree bay, where the water is smoother, with abundant room, if necessary to go to sea.

The COAST.—To the eastward of the mouth of Mary river there is a sandy beach, for 1½ miles, with two small rocky points on it. Sand-hills stretch inland from this beach to half a mile North of mount Bloomfield. Between the sandy beach and Nobby islet the coast is limestone cliffs of a rugged formation, gradually rising to the eastward, to the height of Nobby islet due North of it, and with a black hill 287 feet high, a little East of the islet. With this exception, the hills near this part of the coast are nowhere more than 250 feet high, and are but partially covered with scrub or bushes.

To within one mile of Nobby islet there are at least 12 fathoms water a mile off shore to the eastward of Vivonne bay. One mile South of Nobby islet there are rollers with a heavy swell, in from 7 to 9 fathoms, which vessels should avoid by keeping further off shore.

From near Nobby islet the coast runs East for 2¾ miles, being composed of broken cliffs with little sandy beaches here and there; having scrub-covered hills about 250 feet high, inland; and rocky reefs extending off the shore, an isolated one, 1½ miles East of Nobby islet, being three-quarters of a mile from the coast. There are then three sandy bays, with an extensive sand-flat extending inland from them as far as three wooded sand-hills, the southern and highest of which is 271 feet high; the sea breaks heavily on the beaches and rocks of the eastern and western bays; but if it is tolerably smooth outside, there is landing on the beach of the middle bay, inside two low rocks off the east point. From the eastern bay the coast, which is all rugged limestone cliffs, except a small sandy beach three-quarters of a mile East of a projecting point, is nearly straight S.E. by E. to cape Gantheaume; the narrow projecting point is 3½ miles from the cape.

The conspicuous hills N.W., 4½ miles from cape Gantheaume, are the summit of a wooded range inland. On the coast is a sand-peak 313 feet high, and a conical green hill 282 feet high, 3½ miles and 1½ miles respectively from cape Gantheaume. Between cape Gantheaume and the sandy bays there are 11 to 16 fathoms water, one mile off shore, and 12 fathoms one-third of a mile South from the outer rock off cape Gantheaume.

Nobby Islet, E. ¾ N. 4¾ miles from Ellen point, is an inaccessible limestone rock, 400 yards in extent N.N.E. and S.S.W., and 200 yards broad; it is 245 feet high, and about 300 yards from the coast, to which it is joined by a rocky reef.

CAPE GANTHEAUME, the south point of Kangaroo island, is E.S.E. 10 miles from Nobby islet. The cape is about 150 feet high, steep on its west side and sloping on the east side ; with a reef running S.W. ½ W. half a mile from it, several rocks of which are just above water, and the outer rock awash. There is a breaker one cable to the westward of the outer rock.

Quin Rock, W. by S. ¾ S. nearly 2¼ miles from cape Gantheaume, is of very small extent, and has about one fathom water on it, with 13 to 16 fathoms half a mile off all round. When the sea is tolerably smooth it seldom breaks. Cape Linois (which, coming from the westward, is the first point which opens to the right of cape Gantheaume), open of cape Gantheaume N.E. ¾ E. leads three-quarters of a mile S.E. of the rock ; and Pelorus islet just open to the southward of the outer rock off cape Gantheaume, E.S.E., leads in deep water between the rock and the shore.

YOUNG ROCKS consist of a middle group, the North rock, and the S.W. rock. The largest rock is in the middle group, and is S.S.W. 20 miles from cape Gantheaume, and S.S.E. 21½ miles from cape Kersaint ; it is 400 yards long E.S.E. and W.N.W., about 100 yards broad, and 30 feet high. It is visible about 10 miles, but the swell may often be seen breaking over it from a greater distance. The rest of the middle group are two low rocks together, and a rock under water, the former bearing N.E. by E. 3 cables, and the latter S.W. by S. 3 cables, respectively from the large rock. The North rock bears N. ¾ W. rather more than 4¼ miles from the large rock, is 10 feet high, and about 200 yards in circumference ; the sea generally runs completely over it. The S.W. rock S.W. ¼ S. a little over 2¼ miles from the large rock, is smaller than the North rock, and only 5 feet high.

Soundings.—There are 38 to 42 fathoms water half a mile off the North rock, 33 to 36 fathoms half a mile from the rocks of the middle group, and 39 to 40 fathoms the same distance from the S.W. rock. The deepest water between the Young rocks and Kangaroo island is 45 fathoms ; there are 50 fathoms 3½ miles South from the S.W. rock.

Pelorus Islet, S.E. by E. ½ E. 4¼ miles from cape Gantheaume, is a round bare rock, 40 feet high, and 600 yards in circumference. A reef, with several rocks above water on it, extends E. by N. ½ N. 600 yards from the islet, and there is a rock above water close to its south-west side. There are 19 to 21 fathoms water half a mile from the islet, and a clear deep channel, with 19 to 27 fathoms in it, between the islet and cape Gantheaume. When there is a heavy south-west swell the sea breaks magnificently over Pelorus islet, dashing up sometimes to a height of 100 feet, and falling down all over the rock.

Cape Linois, N.E. ¾ E. 7½ miles from cape Gantheaume, is a bold cliff headland, 235 feet high. Between cape Gantheaume and cape Linois the coast curves slightly; it consists generally of cliffs, with several small sandy beaches at their base, and rocks running off for 200 yards from the points. The highest part of the cliff—282 feet—is 1½ miles S.W. from cape Linois. The highest land near the coast is a scrub-covered hill, 303 feet high, and 4¼ miles from cape Gantheaume.

From cape Gantheaume to cape Linois the average depth one mile off shore is 20 fathoms.

Tinline Point is a low limestone projection, with a remarkable detached cracked rock, open North and South, forming the south-west point of D'Estree bay. It is N.N.E. ½ E. 3¼ miles from cape Linois. From cape Linois the cliffs decrease in height and end altogether at 1½ miles from it; there is then a little sandy bay with a low point north of it; between this point and Tinline point are two sandy beaches divided by a cliff point about 90 feet high, with a sand-hill behind its centre 118 feet in height. There is deep water close to the shore as long as the cliffs continue; but between the southern sandy bay and Tinline point, ledges of rocks and sunken reefs extend quite half a mile from the coast.

D'ESTREE BAY extends from Tinline point N.E. ¾ N. 7¾ miles to Reynolds point, and is 2¾ miles deep. From Tinline point a clean sandy beach with several white limestone cliffs along the shore extends 5 miles; the coast then becomes bold and cliffy to Reynolds point, which is a high bluff.

Anchorage.—The western part of the bay affords anchorage, there being 6 fathoms water a mile off shore, the bottom sandy.

There is good anchorage with the highest limestone cliff in the bay bearing West, and the extreme of Tinline point S. ½ E. 2½ miles, in 5 fathoms, sand. Here a vessel would hardly feel the swell in ordinary weather and off shore winds. By keeping Tinline point on the same bearing as given above, a depth of 4½ to 5 fathoms will be got to within three-quarters of a mile of the point. In ordinary weather there is good landing on the beach from half a mile North of the above mentioned limestone cliffs to within half a mile of Tinline point, there being no surf whatever, even with moderate south-easterly winds, in this space.

Within the 5-fathoms line the soundings quickly shoal to 3 and 2 fathoms half a mile off shore, the bottom at these depths is sandy with patches of limestone crust; the north side of the bay is steeper, there being from 5 to 6 fathoms, less than half a mile off shore from where the cliffs begin. There are 15 fathoms at half a mile off Reynolds point.

Osmanli Reef is formed of several detached patches, which extend about half a mile off the coast. The northern and outer patch lies N.E. half a mile from Tinline point, and in fine weather does not break once in ten minutes. There are 7 to 9 fathoms close outside it; a vessel should give Tinline point a berth of nearly a mile when standing out of the bay. The summit of the highest white cliff in the bay, kept westward of N.W. clears the reef to the eastward.

Reynolds Point, the north-east point of D'Estree bay, is a high, bluff point; steep to.

The COAST.—From Reynolds point the cliffy coast runs N.N.E. 1½ miles into the low sandy bight of Pennington bay, from which the coast trends East 7 miles to a dark rocky point, with a ledge of rocks extending 200 yards to the southward.

Immediately behind Pennington bay, on a narrow isthmus which connects Macdonnell peninsula with the mainland of Kangaroo island, Prospect hill rises to a height of 328 feet; it is a sand-hill covered with bushes, about half a mile inland.

Between Pennington bay and the dark rocky point the coast is generally cliffy, but becomes sandy a mile from the point, from which the cliffy coast trends E. by N. 3 miles to a small beach, through which the stream named Hog bay river flows into the sea.

From Hog bay river the coast trends E.S.E. 5 miles, to False cape. The intermediate coast line is sandy, with nearly bare high sand-hills. and broken by a rocky point about half way which juts almost half a mile into the sea.

Cape Hart is E. ½ N. about 1¼ miles from False cape, and 5½ miles S.W. from cape Willoughby. Cape Hart is a low rocky point, and has a reef extending 600 yards to the southward, on which the sea breaks heavily. There is a small sandy beach on the west side of the cape, and the cliffs rise gradually to the N.E. from it for three-quarters of a mile.

Soundings.—The coast between Pennington bay and cape Hart is bold, there being 8 to 12 fathoms water half a mile off it.

Tide Race.—To the southward of cape Hart the soundings increase regularly to 30 fathoms, about 9 miles off shore. At this distance, apparently from the rocky nature of the bottom, and the ebb tide out of Backstairs passage meeting the heavy westerly swell, there is sometimes a considerable tide race during and after westerly gales. *See* page 642.

Sanders Bank, 15 miles S.E. by S. from cape Willoughby. The bank within the 20-fathoms line is 12 miles in length N.E. and S.W., and 5 miles in its greatest breadth; it is of coral formation, and the least water obtained on it is 16 fathoms, but there may be shoaler places. After gales the sea breaks on it.

Carter Knoll, a small patch with 20 fathoms water on it, lies 5 miles W.S.W. of the south-west end of Sanders bank and 15 miles S.S.E. ½ E. from cape Hart.

CAPE WILLOUGHBY.—Cape Willoughby, the east extremity of Kangaroo island, is a bold rocky headland 173 feet high.

LIGHT.—On the summit of cape Willoughby stands Sturt lighthouse. The tower, which is white, is 75 feet high, or 247 feet above high-water level, exhibiting a *revolving* catopric light; its greatest brilliancy, which appears *every one-and-a-half minutes*, may be seen in clear weather from the deck of a vessel at a distance of 24 miles, and is visible between the bearings of N.E. round by north and west to S. by E. ½ E.

Telegraphic communication is established with Adelaide for the convenience of vessels which, by showing their number, can be reported.

Rocket Apparatus.—In the event of a vessel being stranded at or near cape Willoughby, and the lives of the crew being in danger, assistance will, if possible, be rendered from the shore.

TIDES.—It is high water, full and change, at cape Willoughby, at 4 h. 10 m.; springs rise 6 feet. Inside the cape, the flood sets to the northward and the ebb to the southward.

Cape St. Alban, the eastern headland of Antechamber bay, lies 2½ miles in a N. by W. direction from cape Willoughby.

Scraper Shoal.—A bank of sand and rock, at about half a mile south-eastward of cape St. Alban. The least water on the shoal, bearing E.S.E. 4 cables from cape St. Alban, is 18 feet. This is a sandy patch which apparently shifts in position and depth, and does not break. The shoal is at times nearly dry, and in stormy weather the breakers mark its position; but it should be carefully avoided by vessels keeping this part of the coast aboard, as the tide streams run with great rapidity in its vicinity, and set directly over the shoal. In fine weather, with smooth water, the tide-ripples show the position of the shoal. There are 4 fathoms water in the passage between the shore and Scraper shoal, and 7 fathoms close to its eastern edge.

The depth on the Scraper shoal varies according to the season; generally less water will be found in the winter. At times a ship drawing 12 feet might cross it, whilst occasionally it is nearly awash.

Directions.—The telegraph station (at a distance of 89 yards from the lighthouse) on cape Willoughby kept in line with the centre of the lighthouse leads 3 cables outside or to the eastward of Scraper shoal, in 7 fathoms at low water, spring tides.

By night, when the telegraph station is not visible, a good berth will be kept by not bringing the light to bear to the southward of S. by W.

ANTECHAMBER BAY is formed between cape St. Alban to the S.E., and cape Coutts to the N.W., the distance between these headlands being 3¾ miles. The bight of the bay, which is 1½ miles deep, is bordered by a sandy beach. There are 13 fathoms in the centre of the bay, gradually shoaling to 10 fathoms at 7 cables off shore, when the water suddenly shoals to 3 fathoms, sand, and from thence shoals gradually to the beach. The north-west shore of the bay is high and rocky, the centre low, and the south-east end high and woody. A rocky point, 1½ miles from cape St. Alban, divides the beach. N.E. of this point are some rocky patches, the least water on which—12 feet—is W. by S. from cape St. Alban, and nearly N.E. by E. 4 cables from the point. In its southern part no vessel of any considerable draught should anchor in less than 3½ fathoms, at low water. This latter part, however, is only frequented by vessels employed by the Government to take supplies to the lighthouse.

Anchorage.—This bay affords a most convenient anchorage for vessels bound through Backstairs passage meeting with head winds during contrary tides, and for shelter during gales. Vessels anchor in any part of the bay within half a mile of the beach; but the most frequented anchorage is off the N.W. end of the beach, with cape Coutts N. by W. ½ W. and the entrance to Chapman river (a small stream near the north-west end of the beach), from S.W. to W.S.W. in 3½ fathoms, sand, about a quarter of a mile off shore. This anchorage is perfectly sheltered from all westerly winds and out of the strength of the tide. Good anchorage may be obtained in 3½ fathoms, on a sandy bottom in the south-east angle of the bay, with cape St. Alban in line with South Page island bearing E. by N. ½ N., about half-way between the cape and Rocky point, 4 cables off shore. Smaller vessels anchor further in, according to draught. The tide is scarcely felt inside the 3-fathoms line. The soundings in it vary from 9 to 3 fathoms, and any part of the bay is available, according to the direction of the wind.

From its position it would appear to a stranger that during winds from E.S.E. a heavy sea would enter the bay; such, however, is not the case, as the strong tide streams in the passage cause so great a ripple that the swell is smoothed before it reaches the shoal water. The heaviest swell will be found after strong southerly gales, when a "*roll*" comes in round cape St. Alban, and at times renders landing in the north-west corner of the bay difficult. In such cases the southern portion of the anchorage is the smoothest; but with plenty of cable a vessel will ride in any part of the bay.*

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* *See* Admiralty chart, Backstairs passage, No. 25; scale, $m = 1\cdot0$ inch; also cape Jervis to Guichen bay, No. 1,014; scale, $m = 0\cdot25$ of an inch.

Fish.—The bay abounds with fish.

Cape Coutts, forming the north-west horn of Antechamber bay, is bold high land, with soundings of 14 fathoms within 100 yards of the rocks.

TIDES.—It is high water, full and change, in Antechamber bay at 2 h. 15 m.; springs rise 4 to 5 feet. The flood and ebb streams in the passage run for nearly 2 hours after high and low water.

The Coast.—From cape Coutts a bold cliffy coast, with deep water close to, extends to Hog point rounding gradually.

Hog Bay Point is W. by N. ½ N. 7 miles from cape Coutts. It has a small sandy beach on its west side, and a shallow boat harbour on its east side. The land about Hog bay point is cultivated. There is anchorage for coasters in the sandy bay to the eastward in from 2 to 4 fathoms water, at one to 2 cables off the beach. Small coasters also anchor off the mouth of the boat harbour where they are out of the tide, to land and take in cargo.

BACKSTAIRS PASSAGE.—The eastern entrance into the gulf of St. Vincent and Investigator strait is bounded to the south-westward by the coast of Kangaroo island, from cape Willoughby to Kangaroo head, and to the north-eastward by cape Jervis, a prominent headland, bearing N. by W. ½ W. distant 13 miles from cape Willoughby, and having a ledge of rocks, which extends about 400 yards from its northern point. This passage is 12 miles long, N.W. by W. and S.E. by E., and 7 miles wide, between cape Jervis and Kangaroo island.

The Pages are a rocky group lying N.E. by E., between 8 and 10 miles from cape Willoughby. North Page, the largest of the group, is a rocket islet 69 feet high, and may be seen at a distance of 11 miles from the deck of a moderate-sized vessel. South Page is of nearly equal height with the northern islet, from which it lies S. by W. 1½ miles. There is a channel between these two islets nearly one mile wide, having 7 to 13 fathoms water, which is quite safe with a commanding breeze.

The northernmost of the rocks which lie three-quarters of a mile to the southward of the South Page islet, show above water at all times of tide; but the southern portion forms a reef, always covered.

CAUTION.—During light southerly winds, and a flood stream setting to the northward, this reef should be most carefully avoided by vessels standing across the passage, when to windward of the group.

Yatala Shoal is 3¾ miles long N.W. and S.E., and a quarter of a mile broad, with 8 to 3 fathoms water on it; but as soon as its margin is passed the depth increases to 14 fathoms. Commander Lipson believes the upheaving of this considerable body of sand has been caused by the counteraction of the tide stream, which in this passage operates with great violence; and as it appears possible that each successive year will reduce the depth of water on the bank, it should be guarded against by vessels of great draught. From the shoalest part cape Willoughby lighthouse bears S. by W. 6¾ miles, cape Jervis N.W. by N. 7½ miles, and the south Page E. by S. ½ S. 6¼ miles.

DIRECTIONS.—Backstairs passage presents to the navigator but few difficulties to overcome, it being, with ordinary care, navigable for vessels of any size or draught; and as there is a clear channel nearly 4 miles wide, on the south-west side, and another 3 miles wide, on the north-east side of Yatala shoal, the Admiralty chart will suggest the best route through Backstairs passage. If, on coming from the eastward, and bound up the gulf of St. Vincent, night should be approaching, keep on the north side of the passage, and haul round cape Jervis, all that coast being quite bold. To clear the rocks off cape Jervis keep Sturt lighthouse on cape Willoughby shut in by the high land of cape St. Alban. When the gulf is open, and the vessel is about 5 miles north-westward of the cape, a N. by E. ½ E. course may be steered for the lighthouse at the bar of port Adelaide.

At Night, when proceeding from the southward, Sturt light should not be brought to bear to the southward of W. by S. ½ S. until quite certain of passing well eastward or westward of the Pages islets. By keeping within 3 or 4 miles of the coast of Kangaroo island, these islets are easily avoided; Yatala shoal and the rocks off cape Jervis will be cleared by shutting in Sturt light behind cape St. Albans.

Working to the Southward.—As in deeply-laden ships it will be impossible to beat through Backstairs passage in one tide, it is always prudent, when bound out against southerly winds, to wait during the flood in Antechamber bay.

The TIDE STREAMS, perhaps, demand most attention, as they are rapid and sometimes irregular, often causing delay for days, unless the anchorage in Antechamber bay is taken advantage of. The tidal influence in the southern entrance of the passage does not extend far beyond cape Willoughby, when it takes a direction parallel with the trend of the coast, the flood stream coming from westward, and the ebb setting in a contrary direction.

As the flood in Encounter bay and off Murray beach, to the eastward, runs from the S.E., it is presumed that a meeting of the streams occurs somewhere in the vicinity of the Pages islets. The velocity of the stream in Backstairs passage varies according to the direction and strength of the prevailing winds; but at time it has been found to exceed the rate of 4 knots, and it is believed that under extraordinary circumstances it has even run 5 knots.

KANGAROO-HEAD, which is W. ½ S. 1½ miles from Hog bay point, is the eastern point of Nepean bay. It is a bluff, rocky point, with 7 fathoms water close to, the land rising steeply above the point to between 300 and 400 feet. The flood tide sets rapidly to the westward past Kangaroo head, and forms an eddy to the southward, with strong tide ripples, dangerous for an open boat, off the point.

NEPEAN BAY extends from Kangaroo head N.W. by W. ½ W. 16 miles to Marsden point, and contains three extensive anchorages—Eastern cove, Western cove, and Kingscote harbour.

Eastern Cove is immediately west of Kangaroo head, and extends across to Morrison point W. by S. 6 miles, with a depth North and South of 4½ miles. There is good anchorage in Eastern cove anywhere in from 7 fathoms water between the outer points, to 4 fathoms near the head of the cove.

The coast line of Eastern cove trends S. by W. 2½ miles from Kangaroo head, a rugged rocky shore, to a sandy beach nearly three-quarters of a mile long; and then S.W. by S. 3 miles, in alternate beaches and low rocky points, to the south-eastern corner of the cove. The 3-fathoms bank extends from one-half to three-quarters of a mile from the above-mentioned coast.

From the south-east corner a beach trends round to the south-west corner 3¾ miles West, with a curve to the southward, and broken by only one small rocky point.

At the south-west corner of the cove is the channel leading into Pelican lagoon (locally known as American river); off this part of the beach extensive sand-flats dry out for nearly three-quarters of a mile.

Ballast Head, a bluff-looking point, the lower part of which is composed of black rock, is 2 miles N.E. of the entrance to Pelican lagoon, and S.E. by E. 2½ miles from Morrison point, the western point of Eastern cove. Between Ballast head and Morrison point, the coast line is rocky, with small stony beaches, and some cultivated land behind. There are 3 to 4 fathoms water within a cable of the shore, and 4 fathoms close to Ballast head.

Southward of Ballast head the land rises in wooded hills from a low and rocky shore, fronted by a flat which increases in extent to the southward.

The south side of the cove is low, with wooded hills at the back.

Anchorage.—The best anchorage is on the western side of the cove, with Ballast head bearing from S.W. to N.W., in from 6 to 7 fathoms water on the former, and 4 to 5 fathoms on the latter bearing; and from one-half to 1½ miles off shore. The bottom is ooze and mud.

Towards the eastern side of the cove the holding ground is not so good, there being extensive patches of limestone rock. A northerly gale throws a high short sea into Eastern cove, to escape which, coasters usually anchor under Ballast head, with that point bearing N.N.E., in 3 fathoms, or as far in as their draught will allow. Eastern cove abounds in fish.

Eastern cove is principally frequented by coasters and the small craft belonging to the Colony, overtaken by bad weather from the north-westward, at the out-ports in the gulf of St. Vincent. There is, however, no reason why vessels of a larger class, when seeking shelter, should not take advantage of this fine bay; as a ship will often fetch into Eastern cove, when a day's hard work would be requisite to beat up, during westerly gales, to the anchorage under Marsden point or into Kingscote harbour. Large vessels, from their draught, will not obtain much shelter from northerly winds, as they are obliged to lie too far from under the lee of Ballast head.

Pelican Lagoon, a shallow sheet of water South of Eastern cove, is about 3½ miles long East and West, and 1½ miles North and South. A southern arm of the lagoon extends to within half a mile of the south side of Kangaroo island. Pelican lagoon is connected with Eastern cove by the American river, a passage 2 miles long and half a mile broad, and much narrowed by sand-banks which run out on each side. This channel runs in a S.W. direction from Eastern cove into the west end of the lagoon, after passing on the west side of two small islets.

Buoys.—For the guidance of those who may be desirous of seeking shelter in American river, the entrance has been marked by a chequered black and red perch buoy, moored in mid-channel in 9 feet at low water. Vessels pass on either side of it; about half a mile to the S.W. of this buoy, a similar buoy has been moored in mid-channel. After passing this latter buoy, by attending to the lead and keeping a good look out, no difficulty will be experienced in reaching the anchorage off Buick's, the sand-banks on either side being well defined.

TIDES.—It is high water, full and change, at the entrance of Pelican lagoon at about 4 h.; spring tides rise 4 feet.

The tide in the American river runs at the rate of from 2 to 3 knots, and the flood and ebb streams run from one to two hours after high and low waters respectively.

Morrison Point.—The eastern point of Western cove, is a headland of moderate elevation, having a few straggling rocks at a cable off it.

Western Cove extends from Morrison point across to Beare point, W.N.W. 8 miles. Its southern shore trends from Morrison point half a mile West, and then 2½ miles W.S.W. to a red cliff point; the coast line between being high and rocky. A range of wooded hills extends along the south side of Western cove gradually falling to the westward.

Frenchman Rock lies N.W. by N. to N. by W. from three-quarters to one mile from the red cliff point; it is an extensive rocky patch half a mile long N.W. and S.E., and a quarter of a mile broad. There are 20 feet water just inside the rock, and 5 fathoms directly outside. The shoalest water on the rock is 12 feet, with the red cliff point S.E. by S., eight-tenths of a mile distant. The soundings decrease from the rock towards the shore, from 3 fathoms to 2 close to the cliff point; with several rocky patches on the bottom.

To clear Frenchman rock to the northward. The extreme of Morrison point should be kept to the southward of East, that point bearing East just clearing the north end of the rock ; and Kangaroo head just shut in by Morrison point, bearing E. ¾ N., just leads clear inside the rock, but over a 2-fathoms rock one mile farther to the westward.

The COAST from the red cliff point trends about West for 7½ miles to the bight of Western cove. The red cliffs extend 1½ miles westward from the red point, after which the coast is a continuous sandy beach to the western end of the cove.

Two rocky patches which dry at low water lie off the west end of the red cliff, and bear N.W. and W.N.W. from it, each half a mile off, with only 9 feet water between them and the coast.

Commencing to the eastward from the red cliff point, a sand flat dries off shore from a quarter to half a mile all round the cove.

From the west corner of Western cove the coast trends N.E. by N. 5½ miles to Beare point, at the entrance to Kingscote harbour. This stretch of coast line is low and swampy, with shallow water extending more than a mile off shore. The Three-well or Cygnet river joins the sea S.W. 2¾ miles from Beare point, it is only navigable for boats at high water.

Anchorage.—There is good anchorage in any part of Western cove except off the red cliffs on the south side, where the bottom is rocky. In the centre of the cove there is from 5 to 6 fathoms water, gradually shoaling towards the west side.

More than 3 fathoms water will be found anywhere to the eastward of the western sand-hills on the south side ; and there is good anchorage in 3 fathoms with these sand-hills, bearing South half a mile distant.

Beare Point is low and cliffy ; from it, a low and sandy coast leads N. by W. one mile to Kingscote point, and from which a narrow sand-spit extends half a mile in a northerly direction.

The land between these points is high, and cultivated on the summit.

Bay of Shoals.—From Kingscote point the land trends nearly West, for 3 miles, and then curves round to a low sandy point bearing N.N.W. 2¾ miles from Kingscote point, enclosing a shallow sheet of water known as the Bay of Shoals. This bay is blocked up at its entrance by sand banks, through which there are three narrow channels, the inner parts of which have not more than 3 feet in them at low water. Inside the bay there is a depth of 9 to 10 feet throughout; it is only used by coasters.

The COAST, from the low sandy point at the north end of the Bay of Shoals, trends North 2 miles to Marsden point, which is 4½ miles N. by W. of Kingscote point.

KINGSCOTE HARBOUR.—The eastern sand-bank off the mouth of the Bay of Shoals extends to the eastward and southward nearly 4 miles, and forms Kingscote harbour, a sheltered anchorage for vessels under 18 feet draught of water. The outer part of the above sand-spit runs nearly in a straight line S.E. by E. ½ E. 4½ miles from the north point of the Bay of Shoals, and then S. by W. ¼ W. 1¼ miles to its south extreme. The spit then curves back, being more than half a mile wide; a considerable portion of it is dry at half tide, with two small bushy islets on it. Busby islet North one mile, and Beatrice islet E. by N. 2 miles, from Kingscote point. The south point of the spit may be rounded near to in 15 feet water, but not more than 17 feet will be found S.E. as far as 1½ miles from its extreme.

Buoy.—A red buoy surmounted by a ball is moored off the end of the sand-spit leading into Kingscote harbour in 3½ fathoms water. Vessels anchoring to the southward of this buoy will be clear of the telegraph cable.

Supplies.—Fish are plentiful off the end of the small spit running out North from Kingscote point, and there is a well of good water on the point, a short distance from the beach.

TIDES.—It is high water, full and change, in Kingscote harbour at 3 h.; springs rise 5 feet. At the anchorage in Kingscote harbour the flood sets North and ebb S.S.E. half a mile an hour at springs. North of Kingscote, the tidal streams run through the narrow channels leading into the Bay of Shoals, at the rate of 3 or 4 knots an hour.

Directions for Kingscote Harbour.—Steering for Kingscote harbour from the eastward, Table-topped hill West of Kingscote point will be observed. To enter the harbour, bring a tall clump near the south fall of this hill to bear W. by N. and steer for it until Kingscote point bears N.W. by W. A course of N.W. by W., or straight for Kingscote point, will then clear the sand-spit in 3½ fathoms; and lead up to the best anchorage in 3 fathoms, with Beare point bearing S.W. by W. ¼ W. or W.S.W. 7 cables distant. Should the low sandy extreme not be made out, the high steep part of the point may be steered for when on the same bearing, N.W. by W.

Small vessels may bring the south fall of Table hill over the second beach South of Beare point, bearing West, until Beatrice island is eastward of North, then steer for Kingscote point. By following these directions a vessel will clear the south end of the spit nearly 2 cables.

A good berth for a small vessel is with the bluff land westward of Kingscote point seen over that point, bearing W. by N.; and Beare point S.S.W.; in 12 or 13 feet water, soft sandy bottom.

Vessels rounding Marsden point and bound to Kingscote, should keep that point bearing to the westward of N.W. ½ W., until the red cliff point in Western cove bears South, and so clear the shoal water outside the long sand-spit. The red cliff point bearing South leads eastward of the shoal water in 4 fathoms. Attention to the lead and a good look-out from aloft are necessary.

Telegraph buoy.—A large red bell buoy, marked with the letter T and surmounted by a ball, has been moored off the end of the sand-spit at the entrance of Kingscote harbour, for marking the submarine cable between Kingscote and Yankallila.

Vessels running into Kingscote harbour for shelter, are requested to anchor to the southward or well to the westward of the buoy, in order to avoid the cable.

Two beacons have been erected on Beare point, which, when in line mark the position of the cable, they bear from each other N. 67° W. and S. 67° E. It is particularly requested that vessels will keep well to the north and south of this line before anchoring.

Should a vessel anchor near the cable, a square blue flag will be shown from the telegraph station at Kingscote, signifying that her position, must be shifted immediately.

MARSDEN POINT, the northern extremity of Kangaroo island, is a rocky headland of moderate height; with woody land rising to the westward for half a mile, to a height of 270 feet. A rocky fringe extends from 100 to 200 yards from the shore off Marsden point. The point may be rounded within half a mile, there being 10 fathoms to the northward and 4½ fathoms to the eastward of it, a quarter of a mile off.

TIDES.—Off Marsden point, to the eastward, the flood sets to the westward and ebb to the eastward, nearly 2 knots at springs. In bad weather the streams are very irregular.

Anchorage.—There is good anchorage under Marsden point with the wind to the westward of N.N.W., with the point bearing from N.W. ½ N. to N.W. ½ W. distant from a half to one mile, in from 4 to 6 fathoms, with good holding ground, and smooth water out of the tidal stream.

This anchorage is much used by square-rigged vessels, bound through Investigator strait during the winter gales. By paying attention to the lead and to the bearings of the point, it may be taken advantage of by night with nearly the same facility as during the day.

THE GULF of ST. VINCENT* is formed between the east shore of Yorke peninsula and a range of moderately elevated hills, which extend to the northward, in continuation of those over cape Jervis. The breadth of its entrance between that cape and Troubridge hill, which bears N.W. from it, is nearly 34 miles; and in this space there are regular soundings in 18 to 20 fathoms, which decrease to 12 and 11 on approaching within 4 miles of Troubridge shoals, and afterwards deepen to 22 in mid-channel to the eastward. From the centre of the entrance the gulf extends nearly 80 miles to the northward, gradually decreasing in width from the entrance to the head of the gulf.

In fine weather small vessels can anchor and work cargo off any of the beaches in St. Vincent gulf, but the east coast from cape Jervis to port Adelaide is exposed to the westward, and a gale from that quarter throws a heavy sea on this part of the coast.

CAPE JERVIS, which forms the south-eastern entrance point of the gulf of St. Vincent, is a high bold headland, having but little vegetation. It is intersected by gullies, and has several cliffy projections, the westernmost and most prominent of which is referred to as the cape; although this does not present so steep a face to the sea as the other projections, but gradually slopes down 2 miles from the heights inland. There is a convenient little boat-harbour within the rocks, which extend about 2 cables from the north-west side of the cape; off which the soundings rapidly increase from 4 to 11 fathoms. From the extremity of the cape the coast trends N.N.E. ½ E. 6 miles to Rapid head.

Telegraphic communication with port Adelaide is established. All vessels passing, on hoisting Commercial code signal, will be reported.

LIGHT.—Cape Jervis light is a *fixed* white light, visible for a distance of 13 miles from seaward, between the bearings of N. ½ W. through east and south to S.S.W. ½ W.

Second Valley.—From Rapid head the coast curves East and N.E. by E. about 3 miles to Second valley, a little cove formed by a slight indentation of the coast, affording to small vessels some protection from southerly winds by a rocky point, on which a jetty 105 feet long, with a tramway has been erected. The district is an agricultural one, and coasters carry away the produce.

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* *See* Admiralty charts, Australia, sheet 2, No. 2,759b; St. Vincent gulf, No. 2,389a and b; scale, m = 0·25 of an inch.

There is deep water close to the rocky point which forms the western horn of this little bight; but as the anchorage is exposed to all winds from W.S.W., round by north, to N.N.E., and a heavy sea sets in on the approach of a westerly gale, coasters should leave this exposed anchorage with the first sign of bad weather.

Moorings.—For the convenience of coasters, not exceeding 100 tons, moorings have been laid down. To these chains are secured, in 4 or 5 fathoms respectively, one-inch chains 15 fathoms long, having buoys to which masters of vessels using these moorings may shackle on their own cables and veer according to the state of the weather. It is not compulsory to use the moorings.*

TIDES.—It is high water, full and change, in Second valley, at 3h. 20m.; springs rise 6 feet.

YANKALILLA, situated on the Bungala river, 2 miles from the sea, with a population in 1881 of about 376 persons, N.E. 6 miles from Second valley, has a jetty erected close to the northward of Bungala river, which intersects a sandy beach extending to Carrickalinga, a bold headland N. by E. ¾ E. 3½ miles from the river. The jetty is 420 feet long with 2 cranes on it, but it has only 3 ft. 6 in. at its outer end at low water. Soundings off the jetty decrease from 5 fathoms, on a sandy bottom, at one mile, to 4 fathoms at three-quarters of a mile from the shore; but the whole extent from thence to within a few yards of the beach is one mass of rocks. Coasters carry away the agricultural produce of the district, and occasionally large vessels load wheat, wattle bark, &c.

Telegraph.—There is a telegraph station, and a cable is laid from here to Kingscote on Kangaroo island.

Moorings.—As no anchors could hold on a bottom of so objectionable a nature, moorings have been laid down in 3 fathoms at low water, springs, at about 800 yards north-westward of the jetty, with a 2-inch chain extending 50 fathoms from the anchor.

There are moorings for small coasters, in 2 fathoms at low water, at 300 yards off Yankalilla jetty. Small vessels may shackle on to these buoys and veer towards the jetty.*

Vessels are cautioned not to anchor near the line of telegraphic cable, in case of a vessel doing so, a square blue flag will be hoisted at the flagstaff Yankalilla, when she must at once weigh, and take up another position. To moor or anchor clear of the cable keep the jetty bearing East to E.S.E.

Rocket Apparatus in case of shipwreck is kept here.

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* The moorings have been removed from Rapid bay and Yankalilla.

TIDES.—It is high water, full and change, at Yankalilla, at 3h. 20m.; springs rise 6 feet.

Myponga Bay, S.S.W. about 7 miles from Willunga, although open to all winds from North, round by west to S.W., is safe in southerly winds. There is a jetty 360 feet in length, with 7 feet at low water at its outer extremity.

Buoy.—A red and black chequered buoy has been placed on a patch of sunken rocks off the end of the jetty, in 10 feet at low water. The shoalest part of the patch, with 3 feet water on it, is 40 yards N.N.E. of the end of the jetty.

DIRECTIONS.—To pass inside by the eastern or outer passage, keep fully 100 yards outside the buoy, round to and anchor when the end of the jetty bears S.W., and the buoy N.W. In this position will be found 8 feet at low water, sand and rock.

Small vessels calculated to take the ground may load at the end of the jetty; but in no case should load to more than 8 feet.

Anchorage for large vessels will be found anywhere to the northward of the buoy, there being 3 fathoms at low water within 200 yards of the jetty.

CAUTION.—Masters of vessels should pay great attention to the barometer during the winter season; and in the event of its falling and the wind drawing to the North or N.W., an offing should be sought without delay, and shelter taken in Eastern cove.

The COAST.—From Carrickalinga the coast trends N.E. by E. 5¼ miles to the bight of Aldinga bay, and from thence N. by W. 4½ miles to Snapper point.

Snapper point,[*] from which a reef extends more than a half a mile in a W.N.W. direction, with its western edge trending in nearly a parallel direction with the coast, for fully 2 miles to the southward. Its northern edge extends East to about 1½ cables northward of Snapper point, and then rounds into the bight of Willunga bay.

Buoy.—A large red pyramidal buoy, with a round top, which may be seen at a distance of 4 miles, has been placed in 10 fathoms water, near the edge of the reef stretching westward from Snapper point. In the event of any accident occurring to the buoy, the reef off Snapper point may be cleared by keeping the inn—which is close to the beach on the north side of the jetty of port Willunga—twice its own breadth open North of the end of the jetty. The buoy is placed inside this line.

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[*] *See* Admiralty chart, ports in St. Vincent gulf, No. 2,493; scale, $m = 3 \cdot 0$ inches.

Willunga.—The township of Willunga, with a population in 1881 of 351 persons, is situated at the western foot of the hills, at about 5 miles eastward of the port. Captain Stokes noticed in the neighbourhood slate quarries, where the '*cleavage*' and quality equalled any he had seen in Wales. Large quantities of slate are shipped from here. The district is agricultural. There is a jetty 618 feet long, with a crane on it, having 9 ft. 6 ins. at low water, at its outer end. Large vessels at times load wheat, wattle bark, &c., from this port. There is also a coasting trade.

Telegraphic communication connects Willunga with Adelaide, and there are mail coaches twice daily between the two places.

PORT WILLUNGA, which lies on the north side of Snapper point, and may be recognised by its white cliffs, extends from that point nearly N.N.E. ¼ E. 1¾ miles to Blanche point, and is about one-third of a mile deep.

DIRECTIONS.—Vessels approaching port Willunga from the southward should stand in for the white cliffs, guarding most carefully against the reef which extends from Snapper point, by keeping the red buoy on the starboard hand, or not hauling into the bay until the end of the jetty bears E. by N. ¼ N., in line with a small house on the high ground inland. On this line they may stand in safety and anchor.

Vessels from the northward will find no difficulty in approaching the coast after having passed the reefs off Onkaparinga, 7 miles to the northward of port Willunga.

Anchorage.—There are 6 to 3 fathoms water in the bay, sheltered from southerly winds by the reef extending from Snapper point, which is the only danger near the anchorage. The holding ground is good anywhere outside the 4-fathoms line off the jetty; but the anchorage being exposed to all winds from N.W. round by west, to S.W., at times, a heavy sea rolls in, causing vessels at anchor to be uneasy, and, unless well found in ground tackle, rendering their position unsafe. It is therefore recommended on the approach of a north-west gale—which is indicated by a falling barometer and the wind freshening from the northward with a cloudy sky—that shelter should be sought in Eastern cove, Kangaroo island, where a vessel may anchor in perfect safety, according to her draught, and remain until more favourable weather enables her to return to port Willunga.

Rocket Apparatus.—In the event of a vessel being stranded in or near Willunga bay, and the crew being in danger, assistance will, if possible, be rendered from the shore.

Onkaparinga Head and River.—From Blanche point, 120 feet high, the coast trends N. ½ W. about 5 miles to Onkaparinga head, a cliffy projection, 80 feet high, with a ledge of sunken rocks extending from it. Onkaparinga river is a small stream, which flows into the sea through a bar of shifting sand, at about one-third of a mile to the northward of the head. From the mouth of the river a sandy beach, with sand-hills behind it, trends N. by W., nearly a mile to Witton bluff.

Noarlunga, 20½ miles South of Adelaide, is a small township, with, in 1881, 158 inhabitants, on the banks of the Onkaparinga river, a short distance from its mouth. The district, which has a population of 842, is agricultural, principally wheat growing. There is a telegraph station, and daily communication with Adelaide by coach.

PORT NOARLUNGA (ONKAPARINGA) is a safe and convenient little harbour formed by the protection which two narrow reefs afford the anchorage. It may be easily recognised by Witton bluff, a bold reddish-coloured cliffy projection, 114 feet high, having a remarkable square detached rock at its base, lying nearly one-third of a mile northward of the jetty.

The two breakwater reefs which protect the anchorage from the westward, lie in a direct line about N. by W. ½ W., and S. by E. ½ E., and nearly parallel with the coast, from the low-water mark of which they are distant from 200 to 350 yards; the greatest distance being between the northern reef and the shore, immediately to the southward of the jetty. The north and south reefs together extend from half a mile southward to nearly a quarter of a mile north-westward from the outer end of the jetty, and are separated by Middle channel, between 550 yards from the south extreme, and 630 yards from the north extreme of the reefs.

These reefs are only about 30 yards wide, and the highest parts do not exceed about 4 feet above low-water level; they are consequently, during high springs, covered for a short time to the depth of 2 feet, but at other times they distinctly show their extent and direction by appearing above water.

South Channel, which should only be used by small vessels of light draught, is 100 yards wide at its narrowest part, between the reef and a shoal spit projecting from the beach, nearly opposite the southern end of the reef. There are 9 to 10 feet water near the southern end of the reef.

Middle Channel is 130 yards wide, and has as much as 5 fathoms water in its centre, with the depth decreasing to 3 fathoms close to the points of the reefs on either side.

North Channel is 270 yards wide, with 10 feet water, the deepest water being close to the reef, from whence the depth gradually decreases to 8 feet at about 50 yards from the beach.

Soundings.—There are 6 to 7 fathoms water at a moderate distance from the back of the reefs, and in the harbour the soundings vary from 2 to 3½ fathoms; the deepest water being close to the reefs, and in the northern part of the harbour.

Moorings.—One anchor of 18 cwt. is placed over the south reef at nearly 200 yards from its north extreme, having 60 fathoms of 1½-inch chain stretched in towards the beach. Another anchor of 18 cwt. is placed on the sandy beach at about E.N.E. 300 yards from the former, and has 30 fathoms of 1½-inch chain. The buoys to these moorings are attached by small buoy chains, only to be used for that purpose.

One 18 cwt. anchor is laid over the north reef at about 200 yards from its northern extreme, and a 15 cwt. anchor is placed in a hole on the same reef, at about 200 yards from its southern extreme. Each anchor has 60 fathoms of 1½-inch chain stretched towards the beach, with a small chain attached to it, only intended to hold the buoy which belongs to it.

DIRECTIONS.—From the Southward, a vessel bound for port Noarlunga should keep at least one mile off the coast until Onkaparinga head bears East, when she may steer for either of the entrance channels.

From the Northward.—A vessel intending to enter the port from the northward should keep fully one mile off the coast until Witton bluff bears East, to avoid Horse-shoe rock, which lies about half a mile from that headland.

South Channel.—A vessel under 10 feet draught, entering by this channel, should bring the black beacon on the beach, in line with the upper red beacon on the sand-hills, bearing N. by E. ¾ E. which will lead into the harbour, in not less than 10 feet at low water. Having passed the southern point of the south reef keep close along its inner edge, to avoid the spit which projects from the beach on the opposite side.

To Moor.—It will not be necessary for a vessel to use her own anchors in this part of the harbour, as she may ride by the moorings; but it must be perfectly understood that these mooring chains are not attached to each other. A vessel must, therefore, moor to both chains, either head and stern, or be allowed to swing, by mooring her midway between the reef and the beach, for which there is ample room for any vessel not exceeding 100 feet in length.

Middle Channel.—The fairway of this channel is marked by two square red beacons, the more distant one being that on the sand-hills before noticed, and the other being near the beach; these kept in line bearing about E. by N. ¾ N. will lead into the harbour in 5 fathoms water. After passing the ends of the reefs the vessel may steer for either of the moorings, according to circumstances, but the northern should be preferred, as the water is smoother under the north reef, and she would be more convenient to the jetty.

To Moor.—To use either of the northern moorings it will be necessary to haul up on the small buoy chain until the vessels best bower can be shackled on to the mooring chain; and an anchor must be laid out towards the beach, as strong land winds blow at night, during the prevalence of south-easterly winds.

North Channel.—A round black beacon on the jetty in line with the upper square red beacon on the sand-hills, bearing S.E. ½ E. will lead into the harbour. If the wind be off the land, after passing the end of the north reef, stand in towards the beach, as close as the vessel's draught will permit, and drop the small bower; from this veer towards the mooring buoy, and pick up the large chain. Should the wind be from the westward it will be necessary to pick up the buoy first; and should it be blowing fresh, an anchor should be dropped under foot until the large chain is hove in, as no dependence can be placed on the small buoy chain, if the vessel be pitching to the short sea which comes over the reef at high water.

TIDES.—It is high water, full and change, at port Noarlunga (Onkaparinga), at 4h.; springs rise 6 feet.

Remarks.—Mr. Douglas, from his experience of port Noarlunga (Onkaparinga), speaks most highly of its capabilities as a safe port for coasters not exceeding 200 tons, and of moderate draught. In westerly gales a short sea gets over the reefs at high water, but at other times of tide, when the reefs are uncovered, the water is quite smooth. The jetty which is 600 feet long, with a crane and tramway, will be found a great convenience in loading. The jetty, which is sheltered by the north reef, has 8 feet at ordinary low water, at its outer end, and being visible at a considerable distance from seaward, is a good mark by which a stranger may pick up the entrance of the harbour.

The COAST in this part of the gulf of St. Vincent consists of sand-hills, with occasional reddish-coloured cliffs of moderate elevation. The soundings are generally deep and regular; but some rocky points on this part of the coast have reefs projecting into deep water, which can be easily avoided by keeping a moderate distance off the land. As a rule, except bound into either of the out-ports, it will be prudent not to stand into less than 9 fathoms water.

From Witton bluff a somewhat rocky coast extends nearly N.N.E. 4 miles to Black cliff, and thence 2 miles farther in the same direction, when it is succeeded by a sandy beach, trending N. ¼ W. 4 miles to

Glenelg jetty, which is distinguished by a light and a flag-staff. The coast line about Glenelg jetty makes a slight curve inland, and a creek which dries across the mouth at low water springs, runs into the sea a short distance to the northward.

Mount Lofty, the highest part of a range lying nearly North and South along the east side of St. Vincent gulf, is 2,330 feet high, and visible from any part of the gulf in clear weather, forming a good mark for vessels running up from the south-westward. The summit of the range is thickly wooded, but the spurs and lower slopes are grassy. A spur of this range extends south-westward from mount Lofty, till it reaches the coast about 3½ miles south of Glenelg, entirely changing the character of the coast-line from low sand-hills to abrupt cliffs.

Horse-shoe Rock, nearly half a mile N.N.W. from Witton bluff, dries at low water. The rock is 400 yards long in a N. by W. and S. by E. direction.

Glenelg, 6½ miles to the southward of Adelaide, is a favourite place of resort during the summer months for sea bathing. A railway connects it with Adelaide. The population in 1881, was 2,724 persons.

HOLDFAST BAY is an open roadstead off the town of Glenelg, having gradually decreasing soundings from 7 fathoms at 2 miles, to 2 fathoms at a quarter of a mile off the jetty.*

Anchorage.—The anchorage is in 5 or 6 fathoms water, clay, at 1½ to 2 miles from the shore, with the flag-staff in line with mount Lofty bearing E. ½ N.; or in 5 fathoms, the jetty lighthouse bearing E. by N., distant 1¼ miles. South-west gales cause a heavy sea in this roadstead; but as the holding ground is good, vessels may ride in perfect safety, if provided with good anchors and cables. The anchorage off the jetty is known as Holdfast bay, and was once the port for all vessels bound to Adelaide. It is now seldom used, port Adelaide having been found more convenient and safer. Glenelg has, therefore, become merely a watering place, and a place for landing and embarking the English mails.

Glenelg Jetty.—The jetty is a fine broad structure of iron, nearly 1,300 feet long, with 9 feet at low-water springs alongside the end; it is furnished with cranes, a tramway, and trucks, which, however, are but seldom used.

The water deepens off this jetty much quicker than off the Semaphore, there being 3½ fathoms at half a mile, and 5 fathoms at one mile from the shore.

LIGHTS.—Glenelg jetty, a *fixed red* light 29 feet above the level of the sea, is exhibited from a wooden tower at the jetty end, visible 6 or 7 miles from seaward. Six gas lights are also lighted on the north side of the jetty, during each night in the year, except seven nights each moon.

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* Storm signal:—A blue flag will be hoisted at Glenelg on the indication of bad weather.

Light-vessel.—A two-masted schooner used as a light-vessel, moored in 6¼ fathoms water, and 1¾ miles W. by S. of Glenelg jetty, exhibits 2 *fixed* lights vertically.

The COAST.[*]—From Glenelg the sandy beach trends N. by W. ½ W. 8 miles to Malcolm point, near the south extreme of Lefevre peninsula, presenting a continuous line of sand-hills, behind which the land is low and swampy for some distance. In fine weather the churches, town-hall, the smelting chimney, and other prominent buildings of Adelaide are visible from a ship's deck, if not too close in, and on dark nights the gas-lamps on the West terrace are distinctly seen.

ADELAIDE, the capital of South Australia, and the seat of Government, is on the river Torrens, about 6 miles East from St. Vincent gulf. The city is divided into North and South Adelaide by the river Torrens. The population (1881) numbered 38,479 persons. It is pleasantly situated on a large plain, the mount Lofty range of mountains walling it in on the eastern and southern sides.[†] A plentiful supply of water is obtained from two reservoirs holding together nearly 1,100,000,000 gallons of water filled from the river Torrens.

Semaphore Jetty.—The semaphore jetty and signal station is three-quarters of a mile North of Malcolm point, and about a mile from port Adelaide, across the peninsula. At the signal station the arrival of all vessels, and the depth of water at the inner bar are signalized. The jetty, which has a crane on it, is of wood, and nearly 2,200 feet long, with a cross head, forming a protection to the beach boats in bad weather; it runs out at right angles with the beach in a W. ¾ N. direction, and has a tramway and trucks running along its whole length. There are 9 feet at low water at its outer end. Large numbers of passengers land here.

The sand-flat in front of Lefevre peninsula dries at low-water springs nearly out to the Semaphore jetty end, leaving barely room for the large boats employed by the boarding officers to moor inside the cross head. In fine weather the tug steam-vessels, moor about a quarter of a mile off the jetty, ready to go out to any ship signalised.

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[*] *See* Admiralty chart of port Adelaide No. 1,752; scale, m = one inch.

[†] The climate of Adelaide greatly resembles that of Sicily and Naples. The winter is the rainy season. The sun attains great power, and hot winds increase the heat during the summer months, viz., December, January, and February.

Wheat, wool, and the grape are the principal productions of the colony. In the year ending 31st March, 1875, 9,862,693 bushels of wheat were produced. In 1873, copper, copper ore, &c., to the value of 768,522*l.*, and wool valued at 1,617,589*l.*, were exported. The total value of exports in 1882 amounted to 5,025,688*l.*, and of imports 7,169,939*l.*

PILOTS.—Until lately, pilot cutters were employed to put pilots on board ships down the gulf, but now vessels are boarded by boats from the jetty.

LIGHT.—From a wooden tower at the jetty end is shown, at an elevation of 27 feet above the sea, a *fixed green* light, which in clear weather should be seen from a distance of 5 miles ; visible between N. 65° E. and S. 33° E.

A *fixed red* light is shown from a hulk moored in Semaphore anchorage.

Wonga Shoal, extending off Malcolm point and curving to the northward has from 8 to 11 feet on it for a mile off shore, on the north-west point there are 17 to 18 feet at about 1¼ miles W.N.W. from the Semaphore jetty; and on the western edge of the shore there is less than 12 feet at about three-quarters of a mile W. ½ N. from the jetty. The extreme is marked by a red bell buoy in 19 feet water, lying W. by N. ¾ N. rather more than 1½ miles from the Semaphore jetty lighthouse, and S. by W. ½ W. nearly 2½ miles from port Adelaide lighthouse.

Anchorages.—Vessels of heavy draught should keep the lighthouse at the outer bar E.N.E. until the hulk is in line with the highest chimney at port Adelaide bearing S.E. ¾ E., which leads to the deepest anchorage. The general anchorage for large vessels when waiting spring tides to enter the river is in from 5½ to 4½ fathoms water, about a mile outside Wonga shoal buoy, with the jetty lighthouse E.S.E. to S.E. by E., and port Adelaide lighthouse N.E. to N.E. by N.

Between Wonga shoal and the outer bar of port Adelaide there are no dangers, and good holding ground, bottom sand and weed; the best anchorage will be obtained about three-quarters of a mile to the northward of Semaphore jetty, where there are 18 feet at 2 cables, and 24 feet about three-quarters of a mile from the beach.

This anchorage is protected with the wind between S.W. by W. and South, by Wonga shoal.*

PORT ADELAIDE, the chief port of South Australia, is 6 miles from Adelaide, the capital. The township, stores, and wharves are situated on the south side of the river.

To the westward of the township the stream is crossed by a wooden bridge connecting the port with Lefevre peninsula, above which the stream is not navigable, and after running 2 or 3 miles ends in swamps inside the sand-hills which line the coast. Close to the above-mentioned bridge, on the east side of the stream, are the smelting works of the "English and Australian Copper Company," the chimney of which is the best landmark for port Adelaide; it is of red brick, and can be seen from seaward 12 or 14 miles.

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* Coal was brought alongside in a hulk fitted with a steam winch for hoisting it out; the contractor states that he can put 1,000 tons alongside at one time. Remark Book, Lieut. J. St. C. Bower, H.M.S. *Danäe*, 1879.

The harbour master advises in case of a vessel dragging her anchor, to let go a second at once, as veering cable will be of little use owing to the weedy nature of the bottom. Remark Book, Lieut. R. N. Ommaney, H.M.S. *Espiègle*, 1882.

The township of port Adelaide has a dock with an area of 5 acres, and a depth of 20 feet water; there are also nearly 13,000 feet of wharfage, some parts with 14 to 16 feet at low water alongside, and furnished with steam cranes. There are five patent slips on the north side of the river, the largest, named the "Dunnikier slip," belonging to Mr. H. C. Fletcher, is capable of taking up vessels of 1,500 tons register; another, vessels of 500 tons, whilst vessels of 200 tons can be repaired on the smaller slips; extensive workshops are attached, where all sorts of repairs can be effected. The total wharf frontage is 13,626 feet, or about 2½ miles. The depth at low water alongside ranges from 22 feet to 16 feet. There is a good turnpike road and railway between the port and Adelaide. Tramways are laid down from the railway terminus along the wharves. Fresh water is laid down at all the wharves, so that a vessel can water alongside. Population in 1875 was 2,482, it is rapidly increasing in population and general prosperity.

The number of ships belonging to port Adelaide in 1873 was 143; of these 35 were steam vessels: and the tonnage of the whole 19,242. In 1883 there were 218 sailing vessels with a tonnage of 26,425; and 84 steam vessels with a tonnage of 10,781, making a total of 302, having a tonnage amounting to 37,206. The number of vessels (exclusive of all coasters except steam vessels) which came into the harbour was 837, of which 34 were between 2,500 and 3,000 tons, and 8 over 3,000 tons.

Telegraph.—Port Adelaide is in telegraphic communication with all parts of the colony, and also with Victoria and New South Wales.

Signals.—All vessels arriving from over-sea ports, within 5 miles of the Semaphore station, on Lefevre peninsula, between daylight and dark, or after dark at daybreak, shall hoist the following signals:—

1st. The national ensign at the peak or ensign staff.
2nd. The ship's number by Commercial code.
3rd. The port from whence she arrives.

3rd. All vessels arriving coastwise, within 5 miles of the Semaphore, or within the same hours as above, shall hoist at the main, and keep flying for one hour, one of the following signals, indicating the names of ports or places in South Australia—the figures corresponding with Commercial code book, numeral and number table, part I., page 73 :—

V.W.G. or 1 Port Wakefield, or head of the gulf of St. Vincent.
V.W.H. „ 2 Willunga or Noarlunga.
V.W.J. „ 3 Yankallila, Second valley, or Rapid bay.
V.W.K. „ 4 Kangaroo island.
V.W.L. „ 5 Port Victor, or harbour in Encounter bay.
V.W.M. „ 6 Port Caroline.
V.W.N. „ 7 Port Robe.
V.W.P. „ 8 Port Macdonnell.
V.W.Q. „ 9 Port Augusta.
V.W.R. „ 0 Port Wallaroo, or Tipara bay.
V.W.S. „ 10 Port Lincoln.
V.W.T. „ 12 Any other part of Spencer gulf.
W.B.C. „ 13 Fowler bay.
W.B.D. „ 14 Streaky, or Venus bay.
W.B.F. „ 15 Flinders island, or westward of Spencer gulf.
W.B.G. „ 16 Yorke peninsula.
W.B.H. „ 17 Any part of gulf of St. Vincent not enumerated.
W.B.J. „ 18 Fishing or whaling voyage.

Boarding Station.—Magnetic bearings of limits, extreme end of jetty, from East to E.S.E. ; Lighthouse (outer bar), N.N.E. to N.E.

Should the Customs boat (showing Customs flag and pennant by day ; flash light by night) appear at any other part of the gulf, all ships must heave-to and allow the officer to come alongside, and keep hove-to during the time the officer is on board, or has his permission to proceed.

Lefevre Peninsula is the tongue of low land, about 7 miles long, North and South, and one broad, between port Adelaide river and the sea. From Snapper point its northern coast trends W. by N. nearly a mile to a low sandy point named Pelican point, and then about S. ½ W. 5 miles to a rounded point known as Malcolm point ; the coast line is beach backed by sand-hills about 40 feet high.

Snapper Point, a low sandy beach point, forming the north-east corner of a low tongue of land known as Lefevre peninsula, bears S. ½ W., half a mile from the north end of Torrens island. A cast iron pile with a white top marks the observation spot, which is in lat. 34° 46′ 51″ S., long. 138° 31′ E.

Buoy.—A white buoy, surmounted by a triangular framework and ball, has been moored in the gulf of St. Vincent, in 7½ fathoms water, N.W. by W. ¾ W., distant 7½ miles from port Adelaide lighthouse. The buoy is a guide for the discharge of the silt raised in deepening the channels at port Adelaide.

LIGHT.—At entrance of port Adelaide river, a *revolving* white light is exhibited from an iron tower 50 feet above high water ; the light *revolves* once *every half-minute,* and is visible in clear weather from a distance of 17 miles. The tower is built on piles in 7 feet at low water, about 2 cables westward of the western point of the southern sand-bank.

Leading Lights.—Two leading lights 217 yards apart, when in line bearing N.E. by E. nearly, are exhibited at the entrance of the river. The upper is a *fixed red* light and the lower a *fixed* white light. Twelve gas lights are also exhibited from beacons erected on the most prominent points of the channel leading to port Adelaide.

PORT ADELAIDE RIVER.—The entrance to port Adelaide river is marked by two perch buoys, red on the starboard, and black on the port hand in entering, the red buoy being about 200 yards west of the lighthouse. This is at the commencement of what is known as the outer bar, through which a channel about 1,100 yards in length, and from 200 to 250 feet wide has been made, the depth not less than 18 feet at low water.

To keep in the centre of this channel, bring No. 12 light beacon, and the red leading light in line, bearing N.E. by E. (nearly) until within a distance of about 2 cables of No. 12 beacon, when the cutting will be passed and Lights passage reached. Here the channel widens to between 400 and 500 feet, and retains that width for a distance of about 3,000 yards; the depth being from 20 to 24 feet at low water. The west side of the channel is marked with black buoys and beacons (the outermost having a mirror) for 1½ miles, and the east side by red buoys and beacons as far as Snapper point. In Lights passage there is a mooring buoy in 20 feet water.

The inner bar is next approached, through the whole of which a channel has been dredged 160 feet in width (except for about 1,000 yards, round the curve at Snapper point, where the width is 200 feet) and not less than 18 feet in depth at low water. The width of this cutting is shown at the entrance by black and red perch buoys, and the inner edge (on the starboard hand), all the way up, is marked by red tub-shaped buoys.

At the end of this long cutting, opposite the Kerosine store, the channel again widens to about 200 yards, for a distance of about 1,600 yards, or until abreast of the North arm, and carries a depth of from 18 to 20 feet.

At the North arm it again narrows to about 250 feet and retains that width until about 400 yards past the False Arm, the depths still being from 18 to 20 feet. To keep in the middle of this latter channel, the two beacons on the eastern shore, to the southward of the Kerosine store, must be kept in line. From this point to the Coalshed creek wharfs, in the harbour, a distance of about 1,600 yards, the channel is 160 feet in width, the depths being from 20 to 22 feet at low water.

The entrance to this last cutting is also marked by perch buoys, and the eastern edge (port hand) by black tub-shaped buoys.

At the Coalshed creek, the channel once more widens to 100 yards and is not less than that width as far as the Jervois Railway bridge, a distance of about 2,300 yards, the depth being from 20 to 22 feet at low water.

NOTE.—On the completion of the dredging operations at present in progress, the channels between the lighthouse and the inner harbour will not be less than 250 feet wide and 20 feet deep, at ordinary low water springs; other navigable parts of the river will be also wider and deeper. The depth in the harbour will be not less than 22 feet at low water, or about 30 feet at high water, for a width of from 300 to 500 feet, which, however, is not the full width of the harbour. Wharfage accommodation may at present be found for vessels drawing 24 feet.*

Caution.—Masters of ships should not attempt to enter the river at night without a pilot, unless they are well acquainted with the navigation, and then great care must be exercised, as some of the lights may be extinguished. It is also recommended that large or heavy draught vessels should not enter until the tidal signals exhibited from the semaphore show at least one foot above the vessel's draught. The lowest tide recorded during the month of March 1884 was 18 ft. 6 in., the highest 26 ft. 9 in., and the 58 observations at high water gave from 22 ft. to 27 ft. It may therefore be said that, apart from the improvements effected from day to day, shipmasters may find, in the shallowest part of the channel, twice in every 24 hours, a depth of from 22 ft. to 27 ft., and in many places a much greater depth.

Torrens Island, the north point of which is S.W. by S., one mile from the bathing houses on St. Kilda, is low, about 3 miles long, and 1¼ broad across the south end, tapering toward the northern end. Southward of St. Kilda beach, the coast forms the east side of the channel between Torrens island and the mainland; this channel narrows gradually, till at S.S.E. 3¾ miles from St Kilda it is only 3 cables across at high water; it dries at low water springs, and is only used by small boats and barges. On the south side, a narrow channel called the North arm separates Torrens island from the main.

The east and south sides of Torrens island are nearly entirely covered with mangroves, as are some parts of the west side. There is also a range of sand-hills in the south-west part of the island.

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* Marine Board, Port Adelaide, April 1884.

From the north end of Torrens island a sand-spit, drying at low water, extends about 3 miles to the westward in the form of a fish-tail, the north extreme being W.N.W, 2¾ miles, and the south extreme S.W. by W. ¾ W. 2¼ miles, from the north end of Torrens island; a small bank about half a mile long lies southward of the south extreme, round the southern end of which is the entrance into port Adelaide river.

TIME BALL.—Adelaide mean time is shown daily (Sundays excepted) by the dropping of a ball at the Semaphore. The ball is hoisted half mast high at 12h. 55m. p.m., close up at 12h. 57m. and dropped at 1h. 0m. p.m., or 15h. 45m. 39s. mean time at Greenwich. Should the ball fail to drop, or drop before the time, it will be hoisted again for 10 minutes, at 1h. 15m. p.m., then lowered gently, and dropped at 2 p.m. when practicable.

TIDES.—It is high water, full and change, at the Semaphore jetty at 4h. 40m; springs rise 7¾ feet, neaps 5 feet. During the summer months, at springs, it is high water in the morning and low in the afternoon; at neaps it is low in the morning and high in the afternoon. During the winter months the reverse of this is the case. Westerly and north-westerly winds raise the general level of the water 2 to 3 feet, south-easterly winds depress it about 1½ feet.

Five days before full and change, the tides cease to flow regularly; there is then a very small rise and fall; the first making tide of high-water generally occurs from one to 2 o'clock on the following morning; the tides then run in their usual course to springs. This peculiarity of the tides is experienced in both St. Vincent and Spencer gulfs.

It is high water at Semaphore jetty and at the lighthouse on the Outer bar at the same time. With south-easterly winds it is high water at Semaphore jetty 30 minutes before high water at port Adelaide, and with strong north-westerly winds 90 minutes; on the average 45 minutes.

At port Adelaide it is high water at 5h. 25m.; springs rise 8½ feet, neaps 5½ feet. On the Inner bar it is high water at the same time as at port Adelaide.

Between Wonga shoal and the Outer bar, the ebb tide sets to the southward and flood to the northward. The stream turns, outside the lighthouse about one hour before high, and low water; inside the lighthouse and up to port Adelaide at high, and low water.

Between the lighthouse and Snapper point, the stream attains its greatest strength, but seldom exceeds 2 knots an hour.

The stream sets strongly into, and out of North arm, but between that and the port it seldom exceeds one knot an hour.

Winds.—During the summer, and with fine weather in the winter, as a rule the wind blows off the land all night. It veers to the northward about daylight, and either remains or falls calm until the flood tide makes, when the sea breeze comes up from the S.W., and veers to the southward and S.S.E. by sunset.

The heaviest gales occur in May, June, July, or August. Forty-eight hours is usually the extreme limit they blow from between North and S.W.

Steam-tugs of 80 to 120 horse-power, if required, can be procured by hoisting the ensign at the fore.

A vessel waiting for water to cross the bar, should anchor with a good scope of cable. It is preferable to be at single anchor in this roadstead, as a vessel will ride more easily with one anchor than two, and a high tide which would enable the vessel to cross the bar, might be lost by having two anchors to weigh, instead of one.

Tidal Signals.—The depth of water signalled from the Semaphore is that which exists between False arm and the harbour.

Ball on South quarter yardarm	10 feet water.
„ North „ „	11 „
„ South yardarm	12 „
„ North „ „	13 „
„ South yardarm and masthead	14 „
„ North „	15 „
Two balls on South yardarm	16 „
„ North „	17 „
Ball on South yardarm and South quarter	18 „
„ North „ North „	19 „
Ball at each yardarm	20 „
Two balls at South quarter yardarm	21 „
„ North „	22 „
One ball on North and South quarter yardarm	23 „

The following symbols denote each additional three inches over any of the preceding feet hoisted on the spare yardarm, excepting 20 feet signal, when the symbol is hoisted on the quarter.

A cone with apex upwards denotes	3 inches.
A diamond „ „ „	6 „
A cone with apex downwards „	9 „

In the event of vessels of heavy draught proceeding down the river, the signals will be made until the vessel anchors or passes the Inner bar.

High Water.—A square *red* flag under the outer ball, exhibited at either yardarm. When, as in case of the 20 feet signal been exhibited, balls are hoisted at both yardarms, the flag will be hoisted at the mast head.

Low Water.—A square *blue* flag under the outer ball at either yard-arm.

Mails.—The Peninsular and Oriental mail packets arrive from and depart for England every fortnight. The mail arrives in Melbourne 2 days, and Sydney 5 days after Adelaide dates, and leaves Melbourne 2 days, and Sydney 5 days before Adelaide dates. The Orient company's packets also leave every fortnight.

Mails are also conveyed by the Californian Service, *viâ* San Francisco, New Zealand and Sydney every 4 weeks; and by the Eastern and Australian Company's Service, *viâ* Suez canal, Singapore, Java, Torres strait, and Queensland; also by the Compagnie des Messageries Maritimes.

A Life-boat is kept at port Adelaide, to be sent to any part of the coast by steam vessel, should information of a wreck be received in time to render the service of a lifeboat available.

Sanitary Regulations.—The commander of every vessel arriving at port Adelaide shall allow no person to leave the vessel, and no goods, personal luggage, or any other thing to be sent from the vessel, the mails only excepted, till he shall have obtained permission to that effect from the health officer or one of his assistants. And no one shall be allowed to go on board except the health officer, his assistants, and the pilot, who takes charge, until permission is given by the health officer or his assistants.

No pilot shall bring any vessel over the Outer bar till the health officer or his assistant has boarded, and given directions how far the vessel may proceed. Vessels are detained below the North arm while in quarantine.

Gunpowder Regulations.—All vessels arriving in the ports or harbours of South Australia, having gunpowder on board, exceeding the quantity necessary for stores for their own use, shall hoist the union jack at the main; and no vessel proceeding up the river to port Adelaide shall pass Lipson reach, North arm, without landing all gunpowder exceeding 30 lbs. Twenty-four hours after anchorage shall be allowed for landing gunpowder at the appointed powder magazines.

Gunpowder shall only be landed or removed during such hours as are fixed by the Governor, at the expense of the proprietor or owner; and all boats used in the conveyance of gunpowder shall be properly housed over and covered with tarpaulins. No iron shall be used in the construction of the barrels or packages, and no package shall contain more than 100 lbs. weight of powder.

Moorings.—A screw mooring for the use of vessels having explosives on board has been placed in mid-stream, in 20 feet at low water. Its position is nearly north-west from the entrance to the North arm.

PORT GAWLER, formed by low mangrove bushes, lies S.E. ½ S. 15 miles from Great Sandy point, and N.W. by N. 6 miles from the north extreme of Lefevre peninsula, and is the mouth of a small river flowing about S.W. by W. 17 miles from the township of Gawler. A line of high trees, apparently marking the course of a creek, stands out above the mangroves S.E. of Great Sandy point, their western end lying E. ¼ N. 2¼ miles from the north end of the mangroves. A large grove of much higher trees gradually rising to the centre, appear to the eastward of Gawler point the apex being E.N.E., 2¾ miles from the entrance of port Gawler creek. The entrance is denoted by a red cheese-shaped buoy.

The entrance of port Gawler creek is not easily distinguished from seaward, as the mangroves overlap. It is half a mile S.E from port Gawler point, and about a quarter mile N.W. of a sandy beach which shows through the mangroves, being less than 50 yards across, and an ordinary rowing boat cannot cross the flat of sand and mud, which is three-quarters of a mile wide, till half-flood.

The first reach is not more than a cable long, running about N. by E.; the creek then turns sharp round to E. by S. On the north side of this reach, and 4 cables from the entrance, is a substantial wharf, lately built by the Government, with 2 or 3 feet water alongside at low water. A good macadamized road is carried across the mangrove swamps at the back of the wharf to Two-wells, the nearest township. From port Gawler the coast trends nearly S.E. for 4 miles, and then E.S.E. 2 miles to St. Kilda beach, which has some bathing houses on it.

Port Gawler is the only shipping place between Adelaide and the head of St. Vincent gulf. It is frequented by barges and light draught steam vessels, which take away wheat and farming produce.

Great Sandy Point is a low rounded point, with a long spit, which dries at low-water, springs, 3 miles in a S.W. by W. direction from the point. The land at the back is flat and swampy for a long distance from the beach, the distant hills being too far off to be used as landmarks for a vessel in the fairway of the gulf. A sand-flat extends from 1¼ to 2 miles from the beach, outside which the water deepens slowly, the 3-fathoms line being about 3½ miles off shore, except off Great Sandy point, where it runs out to a distance of 7½ miles from the point in a W.S.W. direction.

LONG SPIT and Buoy, a small flat buoy, painted red, but usually much whitened by sea-birds, with a pyramidal grating, the apex of which is about 8 feet above the water, is moored in 19 feet water, on the shoalest part of a detached bank, lying off the long spit from Great Sandy point, and 4 miles to the southward of it. From Long spit buoy, mount

Lofty bears S.E. by E.; Bar lighthouse, port Adelaide, S.E. by E. ¼ E. 23 miles, Hummock mount N. ¾ W.; Bald spit buoy N. ½ W. 17½ miles, High red cliff, north of Kooley Wurta, West 11½ miles, and Great Sandy point N.E. nearly 9½ miles. About 2 miles W.S.W., and 2½ miles South from the buoy, the water gradually deepens to 5 fathoms. To the northward there are 7 fathoms within half a mile. The 3-fathoms edge of the Long spit bears N. ½ W. 4 miles, and the 5-fathoms edge N.W. by N. 3 miles.

To the eastward of Long spit buoy the soundings are uneven, between 3½ and 4½ fathoms over a rocky bottom, with a narrow channel of 5¾ to 7 fathoms, between the buoy and the shoal water, extending from the land.

From Long spit buoy, the low land forming the east coast of the gulf is not visible from a vessel's deck, unless much raised during hot weather by refraction. The land on the west side of the gulf can be plainly seen, and during the forenoon, if the sun be out, the high red cliff north of Kooley Wurta is easily distinguished.

The COAST.—The sandy beach continues 7 miles S.E. from Great Sandy point, when it is succeeded by a mangrove coast running in the same direction for 3½ miles, with several small creek openings through the mangroves, at the south-east end of which is a sandy beach a mile long, followed by a low mangrove point, and then another beach 2 miles long, at the south-east end of which the mangroves forming port Gawler point commence. The coast inside the beaches is very low and swampy. A sand-flat runs off this part of the coast 2 miles wide in front of the beaches and three-quarters of a mile off port Gawler point.

SANDY POINT the eastern point of entrance to port Wakefield, lies E. by N. ½ N. 6 miles from Mangrove point; it is a low mangrove point, fronted by a sand-spit which dries out nearly 2 miles at low water. A low wooded range rising above the mangrove swamp between this and Wakefield township terminates in a shoulder called Bald hill, bearing N.E. ¾ E. from Sandy point.

The coast southward of Sandy point is a continuous low sandy beach trending to the eastward for 2 miles, and then running nearly S.S.E. for 12 miles to Great Sandy point, forming by the way one promontory, S.E. ½ S. 7 miles from Sandy point.

PORT WAKEFIELD which forms the head of the gulf of St. Vincent, extends from its entrance between Mangrove and Sandy points, 8 miles to the northward, and is 6 miles wide. Its shores are low and lined with mangroves, the northern part of the western and all the eastern shore being swampy, and fronted by a flat of sand, mud, and weed, about mile broad, covered at half tide. Although so spacious, port Wakefield is so occupied by sand and mud-flats, as only to leave a comparatively small space available for shipping, the 3-fathoms line barely extending 2 miles within the entrance. Many large vessels load here in the wool and wheat season, their cargoes being brought from port Wakefield creek.*

Wakefield, 60 miles North of Adelaide, to which vessels run frequently. Population in 1881 was 506. This township exports large quantities of grain and wool; firewood is plentiful, but water is very scarce in summer; vessels are therefore recommended to get a sufficient supply at Adelaide, if touching there on their way up the gulf.

There are several wharves for the accommodation of shipping.

There is telegraphic communication with Adelaide; with which place it is also connected by rail.

Wakefield Creek lies on the eastern side of the port, about 4½ miles northward of Sandy point. The entrance of the creek is fronted by a flat more than a mile in extent, uncovered at low-water springs. Dredging operations have been carried on in a line with the creek, and warping buoys placed on both sides of the channel, to enable coasting vessels to get in and out of the creek without difficulty.

The channel leading to the anchorage has beacons placed on its edges; the western side of the entrance is marked by a black beacon with a round top, and the eastern side of a red beacon having a lozenge-shaped head; a similar black beacon and a red beacon are placed inside.

LIGHT.—A *fixed* white light which can be seen 5 miles is exhibited from the railway station, for small vessels.

Clinton.—On the western side of port Wakefield, about 3 miles northward of Mangrove point, with a jetty 900 feet long and a tramway, not now used, the flat drying beyond it. The place may be known by a single white house, which shows out against the dark scrub behind.

Wills Creek.—The bight between Mangrove point and Clinton jetty, has some red cliffs to the south-westward of the jetty. This bight is filled by a shoal flat intersected by Wills creek, a narrow channel, nearly dry at low water, which from its mouth, at 1¼ miles N. by E. ½ E. of Mangrove point, trends S.S.W. ½ W. 2½ miles into an opening in the mangroves. The channel is marked by red and black buoys.

Bald Hill Beacons.—Two triangular beacons have been placed on Bald hill, the termination of the low wooded range rising above the mangrove swamp southward of the town, as anchoring marks for large vessels. The upper beacon, about 50 feet above high water mark is painted white,

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* *See* plan of port Wakefield, on Admiralty chart No. 2,152; scale, m = 1·5 inch.

23 feet high, and distant 122 yards from the lower triangular beacon, which is painted red, and 26 feet in height.

Bald Spit Buoy.—The shoal water of Sandy point extends to the westward, the 3-fathoms line being over 2 miles from the extreme of the mangroves. A large red nun-buoy is moored in 17 feet water with Bald hill beacons bearing N.E. by E. ¾ E., Wakefield Mill N. by E. ½ E., and the house at Clinton N.W. by W. ¼ W. There are 3½ fathoms water at one cable, and 5 fathoms at one-third of a mile West of the buoy.

Anchorage.—Large vessels approaching this anchorage should shorten sail off Bald spit buoy, and anchor in 4 to 4½ fathoms at low water, with Bald hill beacons in line; Sandy point, the end of the low mangrove swamp under Bald hill, S.E. by E. ¾ E., and the Spit buoy, S. ¾ E. 1¾ miles.

Should a vessel anchor in such shoal water in port Wakefield as to touch the ground, no injury is likely to occur, if care be taken to keep the vessel clear of her anchor, as the bottom is generally composed of sand and mud, and there is no sea.

TIDES.—It is high water, full and change, in port Wakefield, at 4h. 40m.; springs rise 11 feet; neaps 5 to 6 feet. But the tides are very irregular, and much affected by prevailing winds; with strong westerly winds the rise is much greater, whilst the fall is considerably diminished. With westerly winds, there will often be a higher tide at neaps than at springs. In fine weather and south-east winds, when the tides are at the lowest, the rise at springs is much reduced, and at neaps the rise is almost imperceptible, the time of high water being very irregular. Off Bald spit buoy the flood stream sets N. by W. and the ebb S.S.E. one to 2 knots at springs.

Aspect.—The East coast from mount Gawler (1,680 feet high), which bears N. by E. distant 12½ miles from mount Lofty, a range of moderately high and well-wooded hills, decreasing in elevation to the north-westward, extends 64 miles in a north-westerly direction to the hill marked on the chart as being visible from Spencer gulf.

Mount Hummock, the summit of which, being 1,064 feet high, is a good mark for vessels running up St. Vincent gulf. Hummock mount lies 6 miles N. ¼ W. from the head of port Wakefield.

The Soundings in the gulf between Glenelg and the Semaphore jetty are 8 to 6 fathoms 3 miles off shore, and 16 to 11 fathoms 10 miles off shore. In the centre of the gulf the depth is from 18 to 20 fathoms West of Glenelg, 14 to 15 fathoms West of the Semaphore jetty, and 11 fathoms between Kooley Wurta and Long spit buoy, from which place it gradually shoals to 8, and 6, and 5 fathoms in mid-channel off Mangrove point.

DIRECTIONS.—When bound from port Adelaide to port Wakefield, bring the smelting works chimney at port Adelaide on with mount Lofty, bearing S.E. by E. ½ E., and steer N.W. by W. ½ W.; a distance of about 23 miles on that course will bring Long spit buoy to bear N.E. 2 miles, and the Hummock mount N. ½ W., the vessel being in about 5½ fathoms. A course of N. ½ W. for the Hummock, for 18 miles, will bring Bald spit buoy to bear N.E. ¾ E. 1½ miles, when the vessel would be coming between Sandy and Mangrove points and might proceed according to the port Wakefield directions. The above courses are given irrespective of the tidal streams, which, especially in light winds, would throw a vessel considerably off her course, but in clear weather she would have mount Lofty and the Hummocks to determine her position. In thick weather a N.W. by W. ½ W. course might be continued on for 7 or 8 miles beyond Long spit buoy, or until about 3 miles off Yorke peninsula, then run up the coast, keeping about that distance from the shore.

In leaving port Wakefield it is advisable not to start until morning, when the land wind being generally easterly, an offing may be obtained without beating out.

Coasting vessels in working up or down keep on the east side of the gulf, passing inside Long spit buoy, the water being smooth on that side; square-rigged vessels should keep on the west side of the gulf when to the northward of Kooley Wurta.

In beating up the gulf from port Adelaide against head winds, make the first board to the westward for about 16 miles, taking care not to go into less than 8 fathoms, so as to avoid Orontes bank. Then endeavour to work between Orontes bank and the flats which front the eastern shore; and in approaching Long spit care must be taken to sight the buoy, in order to insure being to the northward of Orontes bank.

By maintaining a depth of 5 fathoms the edge of the Long spit may be avoided, and the buoy sighted.

Being off Long spit buoy, and consequently to the northward of Orontes bank, the western shore may be safely approached, making long boards from 5 fathoms outside Long spit, on the east side, to 1½ or 2 miles off the western shore.

Caution.—In thick weather, or in the middle of a summer day, when the sun is ahead, and objects are much affected by refraction, the lead should be in constant use and carefully attended to in going either up or down the gulf.

The Winds during fine summer weather are, from sunrise to about 8 A.M., generally from East to E.S.E. In hot weather the wind in the morning may be from N.E., generally falling calm towards 8 A.M., the sea breeze setting in at about 11, it freshens about 5, and gradually moderates till sunset, when it veers round to the S.E., and dies away towards night. In winter the strongest winds are from the westward.

Weather.—The barometer falls rapidly with northerly winds, both in winter and summer, and generally precedes a change of weather from the westward. In summer, the change often occurs suddenly from the southward, when it blows hard.

The WEST COAST of the GULF of ST. VINCENT.—From Giles point the coast, an unbroken cliff, trends N. by W. ½ W. 3 miles as far as Wool beach, which is about one-third of a mile long, with a high cliffy bank behind it. *See* page 197.

Wool Beach.*—During the wool season upwards of 2,000 bales of wool are shipped from Pickering into coasters for port Adelaide. The coasters lie about a half to a quarter of a mile from the beach in 2 fathoms water. A large ship may anchor off Wool beach in 6 fathoms, with the north end of the beach W. by N. 1¼ miles, and Giles point S. by W. 3 miles.

Caution.—A sandy shoal of 2¼ to 3 fathoms water, running E.S.E. and W.N.W., about 2 miles long and half a mile broad, lies in front of Wool beach, the N.W. end bearing E.N.E. 3 miles from its north extreme. There is a depth of 6 fathoms between the shoal and Wool beach; the water deepening to 4 fathoms to the northward, after which it gradually shoals.

Oyster Point, N. by E. ½ E. 5¼ miles from the north end of Wool beach, is low and sandy, jutting out to the eastward from the general line of coast about half a mile. A few settlers have established themselves in the neighbourhood. The point is not easily distinguished, but its position is marked by some 4 or 5 huts on the grassy slope inside it.

Stansbury.—A small place in Oyster bay at about half a mile from Oyster point. There is a jetty 1,000 feet long with 6 cranes on it, but in 1880 it was of little use, as only small steam vessels could get alongside at good tides. It is a telegraph station.

The COAST between Giles and Oyster points forming Wool bay, presents a line of cliffs from 60 to 90 feet high, till within a mile of Oyster point. The back land is but slightly elevated above the cliffs, and has a flat wooded outline. Northward of Oyster point the coast again takes a cliffy form, but the cliffs are much lower than those southward of the point.

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* *See* Admiralty chart, Macdonnell sound, No. 2,152; scale, m = 1 inch.

South Spit is a long sand-spit drying in patches at low water, and running off Oyster point to the north-eastward, curving to the northward, and forming Oyster bay. The extreme of the spit is N.E. ¾ N., 3 miles from Oyster point.

Anchorage.—Oyster bay affords good shelter for coasters from all winds in 2 fathoms, with Oyster point S. by W. or S. by W. ½ W., and Beach point, the northern point of the bay, W.N.W. to N.W. by W.

Beach Point, about 2¼ miles N. ¾ W. from Oyster point, may be known by a short high patch of white sand in a gully, with a small rocky point on its north side; this point, being kept on a bearing of West, leads a quarter of a mile to the northward of the South spit.

Surveyor Point, bearing N. by E. ½ E. distant 8¼ miles from Oyster point, is of similar formation, having a sand, named Middle spit, extending off it, about 2¼ miles long by half a mile broad, curving to the northward, and drying in patches at low water. The coast continues cliffy till within a mile of Surveyor point, with a few houses.

A beach extends a mile northward of Surveyor point, when a cliffy coast-line again commences, and three-quarters of a mile farther is Streak point, so called from a narrow white mark down the face of the cliff. This point bearing W. ½ S., clears the end of Middle spit in 2 fathoms water.

Beacon.—A black beacon with a circular head, has been erected on the north end of Middle spit in 2 fathoms at low water.

Port Vincent forms a good anchorage for small vessels inside Middle spit, in 2¼ fathoms water, with Streak point bearing N.W. ½ N., and the first cliff point to the southward, just inside Surveyor point, bearing S.S.W. ½ W. A third projection of the same nature, known as North spit, lies N. ¼ W. 4¼ miles from Surveyor point. The spit, however, is smaller, its end being N.E. 1¼ miles from the point off which it runs, and the bay formed by it is very shoal.

Beacon.—A pile beacon surmounted by a black St. Andrew's cross is placed on the end of North spit. This beacon clears the spit leading to what is known as Sheaoak flat.

ORONTES BANK.—A large flat with a general depth of 4 fathoms, but having in some parts as little as 9 feet water, extends in front of this coast, from Wool beach to Kooley Wurta, and runs off for a distance of about 7 miles to seaward, where the water deepens suddenly to 10 or 12 fathoms. The shoalest part lies E. ½ S., distant 8¼ miles from Surveyor point; its margin can frequently be distinguished in fine weather by the change in the colour of the water; the bottom, which is weedy, with bare sandy spots, being at times distinctly visible, and in rough weather by the sea becoming suddenly smooth.

Buoy.—A black buoy surmounted by a framework with a ball on top, has been moored on the tongue of Orontes bank in about 3 fathoms water, E.N.E. 6 miles from Seymour point.

Kooley Wurta, or Black point, is a low beach point, bearing N. ½ E. 9¾ miles from Surveyor point, with a spit of sand and weed, which barely dries in patches at low water springs, extending off the point to the north-eastward. The end of this spit bears N.E. 1½ miles from the point.

Beacon.—A black pile beacon with circular head, has been erected on the north end of the spit running off from Kooley Wurta (Black point), in 8 feet at low water. At a distance of 300 yards, north of the beacon, 12 feet of water will be found.

Port Alfred.—The beach trending back W.N.W. 1¾ miles from the north side of Kooley Wurta forms with the sand-spit a small bay known as port Alfred, affording shelter for small vessels in 2¼ fathoms water, sand and marl, with Kooley Wurta bearing S.S.E., a gap in the cliff West, and the end of the spit E. by N. ½ N. The land behind is level and covered with scrub, with one slight rise about 300 feet above the sea; this rise kept W. ½ S., or open of the northern end of a line of cliffs on the western shore of the port, clears the end of the spit in 3½ fathoms water. A small community has sprung up in the neighbourhood of Black point.

TIDES.—It is high water, full and change, at port Alfred, at 4h. 37m.; springs rise 8 feet, neaps 5 to 6 feet.

The COAST between Oyster point and Kooley Wurta is a mixture of low cliffs and sandy beaches, with few prominent marks to which the attention may be directed; if the sun is not shining on the cliffs the land presents a dark flat outline, gradually rising towards Kooley Wurta. There is a grassy rise, 400 feet high, W. ¾ N. from Surveyor point, but being more than 7 miles inland it does not appear much higher than the rest of the back land. On a bright forenoon the white sand and limestone spots on Dowcers bluff, 1½ miles North of Surveyor point, and also the two red cliffs, one North and the other South of North spit point, are conspicuous objects from about 7 miles off shore.

North of Kooley Wurta the coast trends W.N.W. 1¾ miles, and then North 6 miles; it is rocky, with red and yellow cliffs and small sandy beaches, with a remarkable red cliff 104 feet high rising near the centre. A sandy, and in some places a rocky flat, drying at low water, extends from 200 to 600 yards in front of the coast.

Perara.—When 7 miles northward of Kooley Wurta a sandy beach succeeds the cliffs for 4 miles, forming two small points, the northern one, on which there are two houses, being called Perara. Here the ridge of high land approaches the coast, the scrub having almost disappeared, and the hills, covered with grass, are about 300 feet high. From Perara the ridge of high land extends about N. ½ E. parallel to and at an average distance of 2 to 3 miles from the coast, forming a level range of scrubby hills about 400 feet above the sea, rising gradually towards mount Hummock. About 1½ miles North of Perara the last red cliffs on this part of the coast commence; they are 80 feet high, with a gap in the centre, where there is a jetty at Ardrossan, and the cliffs extend for 2 miles in a N.N.E. direction; the land then becomes very low, with a sandy beach trending N.E. ½ N. 5 miles, when it curves round to Mangrove point, the western point of entrance to port Wakefield. The land behind and to the northward of the red cliffs is covered with scrub, and when well out in the gulf, a hill, bearing N.W. by N. 9½ miles from Perara, rises above the nearer land.

Ardrossan.—Is a small postal town with a telegraph station.

Light.—There is a *fixed* bright light on the end of the jetty, visible in clear weather for 5 miles.

Water, &c.—There are wells of good water at Hungry point, Surveyor point, and Kooley Wurta, but fresh water is scarce along the coast in summer. Kangaroo abound in the southern part of Yorke peninsula, and fish is abundant along the coast during certain seasons.

DIRECTIONS.—From port Wakefield there is no difficulty in proceeding down the gulf if due attention be paid to the lead, and care taken to avoid the shoals on either side. From port Adelaide anchorage steer S.S.W. until to the southward of Troubridge shoals, which course will keep the land on the east side of the gulf in sight, and the vessel out of the influence of the tide stream, which sets through Backstairs passage. But on no account steer a course under the impression that it will weather the shoals, until far enough to the southward to shape a course down Investigator strait, as it would expose a vessel's broadside to the rapid tide stream which sets directly upon Troubridge shoals.

In moderate weather, by closing the shore at sunset, the wind, which usually blows from the land about that time, will be favourable for proceeding down the coast, being careful not to stand too far off shore until to the southward of Troubridge shoals and well down with cape Jervis. Vessels bound to the eastward should keep as close to the cape as wind and weather will permit, to avoid being set to the westward by the flood stream from Backstairs passage.

SOUTH COAST OF AUSTRALIA.

From CAPE JERVIS the coast trends E.S.E. 4 miles and E. by N. 3 miles, of a bold and rocky aspect, with high scrub-covered hills, intersected by deep ravines, rising steeply from the shore, to Porpoise head. The coast then trends N.E. 2 miles, and E. ½ N. 7 miles to a bold cliff point, 3 miles to the westward of which is Tunkalilla beach, upwards of 2 miles in length, but quite inaccessible, from the heavy surf which always rolls in.

NEWLAND HEAD, the south-west point of Encounter bay, is a steep cliff, E. ½ N. 5½ miles from the above-mentioned cliff point, and N.E. ¼ E. 22½ miles from cape Willoughby.

The coast immediately to the westward trends W. ½ N., and is sandy, with rocky points between the beaches, and high land at the back. There is a range of sand-hills half a mile West of Newland head, which is of a dark colour.

Soundings.—There are apparently no dangers near shore between cape Jervis and Newland head, the soundings being from 9 to 13 fathoms at half a mile off the coast, deepening to 15 and 18 fathoms off the sand-hills west of Newland head; except off the west end of Tunkalilla beach, where the soundings are irregular, with a 7-fathoms rocky patch S.S.W. ½ W. 2⅓ miles from the corner of the beach. The water gradually deepens to 14 and 18 fathoms 5 miles off shore.

ENCOUNTER BAY* extends from Newland head to Murray river mouth, a distance of 19 miles E.N.E., and is 5 miles deep with 15 to 18 fathoms in the centre, gradually shoaling to the northward. The only anchorage in Encounter bay at present used is Victor harbour, in the north-west part of the bay. The coast of Encounter bay trends N.E. nearly straight 5 miles from Newland head to Rosetta head, with a high cliff steep-to for most of the distance, but towards Rosetta head the shore is low and grassy.

West Island lies nearly half a mile off a small point, one mile S.W. from Rosetta head. It is three-quarters of a mile in circumference, and 132 feet high, steep-to to seaward, but connected with the shore by a rocky ledge which generally breaks.

Rosetta Head is a grassy mound, 317 feet above high water, cliffy to the eastward, and covered with granite boulders. The head is steep-to on its south and east sides, with 12 fathoms water half a mile off.

Between Rosetta head and Freeman knob, which bears N.E. 5 miles from the former, and is the south point of port Elliot, the coast bights in and forms the anchorages of Rossetta and Victor harbours.

Rosetta Harbour, which is formed by the land trending to the N.W. close round Rosetta head, is quite open between S.S.W. and East, and only available for small coasters. It is not used.

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* *See* Admiralty plan, port Victor, Encounter bay, No. 2,493; scale, m = 3 inches. Also chart, cape Jervis to Guichen bay, No. 1,014; scale, m = 0·25 of an inch.

Seal Rock, N.E. by E. ½ E. 2 miles from Rosetta head, is a mass of granite boulders 40 feet high. A reef on which the sea breaks heavily extends nearly 400 yards westward of Seal rock. At about 100 yards to the eastward of Seal rock is another reef, and at a quarter of a mile from the rock in the same direction is a rock with 26 feet water over it, on which the sea breaks with great violence in bad weather.

Wright Island is a small islet, about a quarter of a mile in circumference, N.N.E. nearly half a mile from Rosetta head, and the same distance off shore. The sea breaks on a reef which runs off the south side; the water is shoal between Wright island and the land, but deep close outside.

Granite Island, nearly 9 cables N.W. of Seal rock, and N.E. by N. 1¾ miles from Rosetta head, is bare-topped, half a mile East and West, and about a quarter of a mile broad. The summit of the island, which is nearly level, is 113 feet high. Granite boulders are scattered in great numbers over the sides of the island, and a very large one stands upright at the west end.

Shoal water extends off the low sandy beach between Rosetta head and Granite island to a distance of from one-half to one mile, and a rocky ledge with from 17 to 27 feet water extends from it to Seal rock; the shoalest part, 15 feet, is about 3 cables West of Seal rock. The sea breaks heavily on this ledge in places during a S.W. gale, and in all the space between Rosetta head and Granite island.

There is a passage between Seal rock and Granite isle, the depth being from 4½ to 7 fathoms; but in bad weather, or when the ocean swell rolls in heavily, the sea in some places breaks with great violence. This passage is not recommended, except in fine weather, and with smooth water.

Soundings.—Outside Granite island the soundings shoal gradually from 12 to 5 fathoms; but inside the 5-fathoms line, on its north side, when the east end of the island bears to the eastward of South, shoals rapidly to 3 and 2 fathoms.

Anchorage.—To the westward of Granite isle there is a good anchorage, named Davenport, available for moderate-sized vessels. It is, however, not recommended, as the approach to the westward of Granite isle is indifferent, and Victor harbour to the eastward, renders the use of Davenport unnecessary.

PORT VICTOR, on the shores of Victor harbour, 64 miles South of Adelaide, with a population of 533 persons in 1881. A jetty, built on a rocky causeway, awash at low water springs, along which is an iron tramway, connects the mainland with Granite island, from which a causeway projects into 9 feet at low-water; a granite breakwater is being carried out in a N.E. direction, from the eastern point of Granite island, for 1,000 feet to 43 feet at low-water; inside this breakwater a screw pile jetty has been erected, with 25½ feet water at it outer end, for the accommodation of large wool and other vessels. Provisions may be obtained.

Port Victor is connected with Strathalbyn by tramway, and thence with Adelaide by coach. A railway is in course of construction. There is also a tramway to Goolwa. There is a telegraph station here.

Victor Harbour, about 2 miles N.E. from Rosetta head, is situated in the bight between Granite island and port Elliot to the N.E., the town of port Victor being built on the low sandy point nearest Granite island, from which the beach curves round to the eastward to Freeman knob, broken by the mouth of the Hindmarsh river, which enters the sea a mile to the northward. Another small river, the Inman, enters the sea half a mile S.W. of the point. The water shoals gradually towards the mainland, but more rapidly towards the rocky shore of Granite isle and the reef which connects it with the mainland.

A heavy swell sets in at times. Victor harbour is the shipping port for much of the Murray produce, which comes down to Goolwa, the river Murray port, by steam vessel and thence to Victor harbour by tramway.*

To Moor.—If the moorings be used, the pilot or harbour master will give the master all necessary information.

Anchorage.—The anchorage in Victor harbour is not good, the bottom under 5 fathoms being mostly limestone rock, with a thin coating of sand; but to obviate this objection heavy moorings have been laid down. The in-shore moorings are for three vessels, having at low-water, depths of 9½, 14½ and 19½ feet; the outer moorings, also for three vessels, 18, 33, and 30 feet water.†

LIGHT.—A *fixed* white light is exhibited from the extremity of the breakwater at port Victor, at an elevation of 26 feet above the sea, and visible in clear weather from a distance of 5 miles.

DIRECTIONS.—Vessels from the southward, bound to Victor harbour, are liable during the prevalence of strong south-westerly winds to be set to the eastward of their estimated positions. It is therefore desirable to steer direct for Rosetta head; and at all times, during day or night, it is preferable to make this headland, as the coast near it is bold and free from outlying dangers.

As the swell is generally very heavy on this part of the coast, care should be taken against getting too close in with the land about Rosetta head in moderate or light winds, as the wind sometimes suddenly falls light when the high land is approached.

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* **Storm signal:** —A blue flag will be hoisted on the indication of bad weather.

† This is an exposed anchorage; and the moorings are at present not trustworthy Captain's and Navigating Officer's Remark Books, H.M.S. *Danäe*, February 1879.

Having closed with the land so as to make out Seal rock, a vessel may steer so as to pass half a mile to the southward of the rock, and haul round under its lee, or north-east side. From thence a N.W. course may be kept towards the harbour, within which the mooring buoys will be seen. In rounding the rock during a south-west gale, or a heavy swell succeeding one, keep close (outside), or keep off at least a mile, until it bears W.N.W., then shape a course for the anchorage.

By Night.—If the Seal rock can be distinguished at night, there is no danger in standing for Victor harbour, while keeping the lead going. Vessels approaching from the south-west should not steer towards the port until the light on the breakwater bears N.W., and by keeping it on that bearing, should pass about 2½ cables eastward of Seal rock. But strangers having no pilot on board, should be very cautious in approaching the coast to the eastward of Rosetta head during the night.

Life Boat and Rocket Station for rescuing shipwreck crews.

Pilots.—A pilot can be obtained on hoisting the usual signal when approaching the coast. On a vessel nearing the moorings in Victor harbour, the harbour-master will come off and point out the moorings to be taken up. There are no Government pilots at port Elliot or Rosetta head.

It is not compulsory to employ a pilot for port Victor, the assistant harbour master can act if required.

TIDES.—It is high water, full and change, in Victor harbour, at 1 h. 9 m.; springs rise 4 to 6 feet.

PORT ELLIOT,* N.E. 5 miles from Rosetta head, and 59 miles South of Adelaide, with a population of 258 persons in 1881, is the easternmost harbour in Encounter bay. This town is a favourite resort during the summer months. The port is a small bight on the east side of Freeman knob which is 89 feet high, and distinguished by a white obelisk, visible at a distance of 10 miles. The port is only a quarter of a mile across to Commodore point on its north-east side, and barely 2 cables in depth, and is now quite deserted by shipping.

The port Victor and Strathalbyn tramway runs through the town, and there is a telegraph station.

Pullen island and a small breakwater off Freeman knob partially protect port Elliot from the ocean swell, which occasionally breaks outside in fine weather, and rolls right in through the southern entrance to the beach. The Twins, a rock nearly awash, lies right in the centre of the southern entrance, which should never be attempted, the northern entrance between point Commodore and the reef off Pullen island being by far the safest.

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* *See* Admiralty plan of port Elliot, No. 2,493; scale, $m = 3$ inches.

The depth of water in port Elliot is from 12 to 15 feet, rapidly increasing outside Pullen island to 6 and 8 fathoms.

The small jetty in the north-west corner of the port is rapidly decaying.

Pullen Island lies a quarter of a mile E. by S. from Freeman knob; it is a mass of granite boulders, 20 feet high, about 350 yards long East and West, and 150 yards broad. A reef of rocks extends towards the port in a north-westerly direction 400 yards.

THE COAST[*] from Commodore point trends N.E. ½ N. for half a mile to a low stony point, to the northward of which the beach makes a small shallow bight; E.S.E. three-quarters of a mile from this point lies the Frenchman rock awash; north-westward from Frenchman rock foul rocky ground extends to the beach, which trends N.E. one mile to Middleton, where there is a rocky point. The beach then trends E. by S. ½ S. 9½ miles to Murray river mouth, backed by bushy sand-hills from 80 feet high, gradually falling to the eastward until within a mile of the Murray mouth, the west point of which is a flat of white bare sand.

Aspect.—The appearance of the land at the back of Victor harbour and port Elliot is that of gently sloping hills, rising to a height of 500 to 900 feet, about 2 miles inland, with wooded summits and cultivated sides, broken to the northward of Victor harbour by the gap formed by Hindmarsh river as it flows towards the sea.

SEA MOUTH of MURRAY RIVER.—From Frenchmen rock the northern coast of Encounter bay extends nearly 10 miles in an E. by S. direction to the Sea mouth of Murray river, which is a narrow opening in the beach, and may be recognised by Barker knoll, about 90 feet high, and is the first bare sand-hill of any elevation or extent, to the eastward of the high land of Encounter bay, the west side being low and flat. Various plans have been under consideration for the improvement of the entrance to the river.

The surf usually breaks heavily across the mouth of the river, except in the finest weather; it is only used by vessels of light draught.

The Murray is navigable from beyond Albury in New South Wales, to lake Alexandrina, thence to the sea, a distance of about 1,500 miles. Vessels of over 6½ feet draught cannot pass Ram island bar, about 12 miles above Goolwa, except during high floods. A channel has been cut 150 feet broad, and marked by five red beacons and two black, the red beacons to be left on the starboard hand, and the black on the port, by vessels going up.

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[*] *See* Admiralty chart, Australia, South coast, cape Jervis to Guichen bay, No. 1,014; *m* = 0·25 of an inch.

Barker Knoll.—This extraordinary hill, which forms the eastern side of the Sea mouth of Murray river, is ever changing in its form and appearance, according to the prevailing winds, and is fast receding to the eastward, in which direction the entrance has shifted 500 yards in four years.

The Channel through the Sea mouth, or entrance of Murray river is bounded to the eastward by Nation bank, which extends a considerable distance to the south-westward from the base of Barker knoll; and the edge of the shoal, extending from the West bank to Pullen spit, forms the western limit of the channel.

The Bar, 5 cables in a southerly direction from the entrance proper, consists of sand, shells, and small stones, hard on the east side and moderately firm on the west; in March 1876, the bar was about 2¼ cables across in a north and south direction in the middle, 1¼ cables on the west, and 2 cables on the east side, with depths to 7 to 8 feet. It is constantly shifting and altering in extent, depth, and relative position to Barker knoll. It has been observed that the heaviest rollers break well outside the bar, in 3½ to 4½ fathoms, whilst the bar is tolerably free from rollers of any considerable height.

Within two hours either before or after high water, 10 to 11 feet might be depended on as the least water on the bar, except for three or four days during neap tides with south-east winds, when there would be barely 10 feet at high water.

During the finest weather, when there is no break on the bar, the height of the swell on it is 3 to 4 feet, the average break being 6 feet; the ordinary outer break is at about the 2-fathoms line, and is from 5 to 8 feet high. On the west side of the bar the waves gradually curl round at right angles to Pullen spit, decreasing in height, but breaking over it sometimes in Goolwa channel. On the east side the breakers do not extend on the shore further than the south-west point of Nation bank, but they are the same height close to the beach as on the bar. Although the sea is very confused, it never breaks in the channel inside the bar. In the heaviest seas, caused by westerly gales, or by heavy gales which do not always reach the coast although the swell does, the sea breaks in 5 fathoms water, the waves being 18 to 20 feet high.

Within the bar the soundings vary considerably, and the channel will generally be found deeper and more direct in the winter months, trending more in a westerly direction as the descending currents become lessened in volume during the summer.

The channel within the bar is 3¼ cables long in a north and south direction, about one cable wide, and nearly 40 feet deep in some parts, bottom fine sand, and shells; on the east side of the channel there are 18 to

30 feet hard bottom close to Nation bank. Pullen spit is more shelving, and the bottom soft, being kept continually in motion by the breakers.

Nation bank, on the east side of Murray river entrance, covers only with spring tides, and during strong north-west winds; the outer edge of this bank trends in an E.S.E. direction, and is the low water limit of the sea beach of Younghusband peninsula. In 1877 the bank extended 1¼ cables in a westerly direction from the base of Barker knoll. The shoal with less than 6 feet on it, that extends 4 cables in a S.S.E. direction from the south-west point of Nation bank, forms the eastern limit of the channel over the bar.

Pullen spit, on which the sea usually breaks heavily, lies on the west side of Murray river entrance, and which, in 1876, was for the most part covered, except when low water spring tides occur with south-east winds, in 1878,* was above the level of high water. The outer edge of this spit trends to the westward, and is the low water limit of the sea beach of Sir Richard peninsula. The shoal with less than 6 feet on it, which extends 2¼ cables in a South direction from the south point of Pullen spit, forms the western limit of the channel over the bar.

BUOY.—A red buoy has been placed in 6 feet water to mark the sand-spit which extends from the S.E. end of Hindmarsh island.

Directions.—The best time for passing through Murray river entrance is from two hours before, to two hours after high water, and if the sea be breaking heavily, by watching and going through directly after a heavy roller, a steam vessel could cross the bar before another sea broke; 3 to 4 feet is considered sufficient to allow for scend in ordinary weather.

Masters of vessels, acquainted with the entrance, having taken all requisite precautions, should steer towards it; but before shoaling the water to less than 5 fathoms (if the bar be not quite smooth) it would be advisable to keep the vessel in that position, in order to observe if the rollers break with sufficient force to endanger the steering; being satisfied that the condition of the bar is safe, steer in. In 1880 the bar was navigable for 300 days.

Having passed Barker knoll (where the channel is only about half a cable wide) and proceeding up Goolwa channel, leave the red buoy off the south-west extreme of Hindmarsh island on the starboard hand.

Masters of vessels having a limited knowledge of Encounter bay and the entrance of the Murray, will be only acting prudently if they avail themselves of the services of the harbour-master stationed at Victor harbour, or any other duly qualified pilot, to guide them through the entrance.

In the event of a vessel arriving off the Sea mouth of Murray river, and finding the surf too heavy for her to attempt the bar, she is recommended to proceed to Victor harbour, in which place she may safely wait for a favourable opportunity to cross the bar, which is not likely to occur whilst the sea breaks heavily on Seal rock, as by this a fair estimate may be formed of the state of the bar.

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* *See* Report on Murray river mouth to House of Assembly, 29th May, 1879.

Caution.—No sailing vessel should at any time attempt the passage with a scant or light wind, unless it be quite smooth on the bar.

TIDES and TIDAL STREAMS.—It is high water, full and change, on the bar of Murray river at 0h. 50m., highest springs rise 6 feet, ordinary springs 3 to 4 feet, neaps 2 to 3 feet; highest springs occur with north-west winds, and lowest with south-east winds.

On the bar at the Sea mouth of the Murray river, high tide occurs in the night or morning from September to March; and from March to September in the day or afternoon. Also that the time of high water only varies two hours from the time observed on full and change days (0h. 50m.), ranging from 11h. when the moon's age is 10 or 26 days; to 3h. when the moon's age is 20 or 7 days.

In the Murray mouth the ebb tide runs strongest at low water, the ordinary rate then being 3 knots on the surface in the deep part, and 4 knots on the bar.

If the tides do not rise more than 2 feet the ebb stream runs on the surface during the whole of the flood, its strength being less than one knot at high water. The flood stream ordinarily makes from the south-eastward, descending under the outgoing fresh water on the east side of the bar, and not coming to the surface until it has entered the Coorong.

The flood stream does not generally run on the surface until about two hours before high water during spring tides, and with north-west gales, at half flood; at ordinary springs the ebb stream commences to make out about one hour after high water.

In the Goolwa channel the ebb stream runs continuously on the surface when the tide does not rise more than 2½ feet; at ordinary springs the tide commences to flow along the bottom at half flood, but does not flow on the surface until one hour before high water; the ebb tide begins to make an hour after high water.

In the Mundoo channel the stream turns about the same time as in the Goolwa, except that the sea breeze blows up the channel, and retards the ebb stream on the surface.

In the Coorong channel the flood stream makes underneath directly after low water, but does not flow on the surface at once; the ebb stream commences to make soon after high water.

The depth on the Murray bar may be ascertained by adding 6 feet to the height shown by the tide-gauge on the jetty at port Victor.

Semaphore.—A flagstaff has been erected on Mundoo island from which tidal signals are made.

The following signals will be shown from the flagstaff, on vessels approaching the bar from seaward; or to those proceeding to sea, namely:—*

First quarter flood.—Red-flag at mast-head.

Half flood.—Red flag at mast-head; ball at east yard-arm.

Last quarter flood.—Red flag over ball at east yard-arm.

High water.—Red flag over ball at mast-head.

First quarter ebb.—Blue flag at mast-head.

Half ebb.—Blue flag at mast-head; ball at west yard-arm.

Last quarter ebb.—Blue flag over ball at west yard-arm.

Low water.—Blue flag over ball at mast-head.

As it frequently happens, that owing to freshets and other causes, the tide rises without the stream setting over the bar from seaward, the following signals in such cases will be made, viz.:—

Instead of one ball with the flood tide signals, two will be used.

Bar dangerous.—When the bar is dangerous, and should not be approached, a blue flag over a red flag will be hoisted at the mast-head.

Information relating to the state of the channel and bar should be obtained at Goolwa or Mundoo island before proceeding to sea.

Lakes Alexandrina and Albert.—Within the Sea mouth of the Murray there are three openings, leading into lake Alexandrina, which is 20 miles long, East and West, 10 miles wide, and forms the estuary of the river which flows into its eastern end. On the south side of the lake a narrow opening leads nearly 5 miles south-eastward, into lake Albert, which is about 5 miles wide, and extends 10 miles southward, to within 3 miles of the sea coast.

GOOLWA, on the west bank of the river Murray, 60 miles from Adelaide, with which place it is joined by a tramway, is the oldest established port in connection with the trade of that river, which is large and extending, requiring an increase of wharfage and storage accommodation. The jetty is 700 feet in length, and has 6½ feet at low water at its outer end. There is a yard for building and repairing steam vessels; also a patent slip. Population in 1881, 688 persons.

Goolwa or the Lower Murray.—The westernmost of the three channels between the Sea mouth of the Murray and lake Alexandrina, extends nearly W.N.W. 6 miles from the inner entrance of the Sea mouth of the river, to the township of Goolwa. It trends along the south side of Hindmarsh island, and in nearly a parallel direction with the northern shore of Encounter bay, from which it is separated by a long neck of land only about a quarter of a mile to three-quarters of a mile broad.

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* The semaphore flagstaff on Mundoo island, formerly used for guiding vessels over the bar is abandoned. Letter from Marine Board of South Australia, 7th February 1884.

The north side of the Goolwa channel is bordered by low swampy land, and near the mouth by a sand-bank which partially covers at high water neap tides, and covers entirely at high water spring tides, up to the high water mark of Hindmarsh island.

The entrance to this channel between the east end of Sir Richard peninsula and the spit off the S.E. extreme of Hindmarsh island is 200 yards wide at low water, with depths of 14 to 16 feet.

The channel between West bank and the townshhip of Goolwa varies from about 120 to 300 yards in width, with 10 to 30 feet water. About half a mile within the entrance is port Pullen, in which there are 10 to 14 feet water.

Between half a mile and three-quarters of a mile below Goolwa jetty the channel is divided into two narrow passages by Middle shoal, the northern being the direct passage.

From the township of Goolwa the channel of the Lower Murray trends 8 miles in an easterly direction along the north side, to the east point of Hindmarsh island, and has two creeks branching off to the north-westward. From the east point of the island the channel continues eastward 5 miles to the entrance of lake Alexandrina.

Surveys for a canal have lately been made to bring the waters of the Murray to the sea across the sandy neck south of Goolwa, blocking up the old mouth, which shifts about. As keeping open the mouth of such a canal, in the face of the surf, would necessitate the building of long piers extending into the sea, and would be an expensive undertaking, it may not be carried out for many years.*

River Beacons.—Beacons have been placed on the steep sides of the banks forming the channel to the township of Goolwa. The black beacons, which have round tops, are on the south side; and the red beacons, which have lozenge-shaped heads, are on the north side. By keeping the black beacons on the port, and the red beacons on the starboard side in going up, and the contrary in going down, there will be no difficulty in navigating the channel from West shoal to Goolwa jetty by any vessel that can cross the bar.

Anchorage.—On arriving off the township of Goolwa there is ample space to anchor in 2½ to 3½ fathoms water a convenient distance off the jetty.

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* A report with an estimate has been made for dredging to 4½ feet the bars and flats in the Coorong, from its entrance into lake Alexandrina to Salt creek, and similar work from Goolwa to Salt creek, *viâ* the southern portion of Hindmarsh island.

Hindmarsh Island is 8 miles long, East and West, and 4 miles broad, its south-east side being separated by a narrow opening from Mundoo isle, between which and the extensive shoals to the eastward there is a channel leading to the entrance of lake Alexandrina.

MUNDOO is the central channel between the Sea mouth of Murray river and the entrance to lake Alexandrina; this channel near its mouth is about 60 yards wide at low water, and has a sandy bar stretching entirely across with 4 to 6 feet water for a distance of 200 yards in a north and south direction.

COORONG CHANNEL entrance is between Nation bank and the shoal extending south from Mundoo island; there are depths of 12 to 26 feet for a distance of a mile from its mouth; about a mile further up, the channel becomes contracted by extensive banks (partially covered) on either side, extending 70 miles along the back of the beach to the south-eastward. This inlet is one to 2 miles wide, the barrier or beach which separates it from the sea-coast being rarely more than one mile across.

The COAST.—Murray Mouth to Lacepede Bay.—From the Murray mouth the coast trends S.E. forming one unbroken sandy beach for 92 miles, which curves slightly inwards.

There are sand-hills at the back of the beach for the whole distance, varying in height from 90 to 160 feet, but there is such a similarity in their appearance the recognition of any particular one is very difficult, except, perhaps, of some of the bare patches. At 6 or 7 miles off the land it is difficult to recognise any marks on shore.

The surf on the whole of this beach is heavy at all times, and in westerly and south-westerly gales extend in some places 3 to 4 miles from the shore.

Caution.—Vessels should keep as far out of the bight between Encounter and Lacepede bays as possible; it is a dangerous place with the wind blowing on-shore, or to be becalmed in.

LACEPEDE BAY is formed by the bight in the coast between cape Jaffa and the Granite rocks, N.N.E. and S.S.W. 19 miles from each other. It is a remarkable fact that this bay, although apparently exposed to the ocean swell, affords safe anchorage in all weathers, there being tolerably smooth water even in the height of a westerly gale. Two reasons account for the smoothness of the water. The force of the prevailing swell from the S.W. is broken by the reefs off cape Jaffa, and that from the N.W. and West by traversing (before it arrives near the anchorage) a long extent of undulating ground with shallow water over it, there being only 20 fathoms, 16 miles West of Kingston jetty.*

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* *See* Admiralty plan of Lacepede bay, No. 1,006; scale, *m* = one inch.

Buoy.—A black and red chequered buoy, with beacon top, is placed on a shoal patch, having 1¾ fathoms on it at low water. This patch lies directly in the track of vessels bound to or from Kingston, and bears W. by S. 1½ miles from the inner end of Kingston jetty.

Vessels drawing more than 12 feet should not approach it within 3 cables.

Granite Rocks, N. ½ W. 9½ miles from the mouth of Maria creek, and S.E. ¼ S. 80 miles from the Murray mouth, are two conspicuous rocks on the beach close to the sea, the larger 19 feet high. They show black against the sand behind. Some rocks which uncover with the tide extend 100 yards to seaward from them.

Nation Rock, S.W. ¾ S. rather more than one mile from the Granite rocks, and one mile off shore, is about 80 yards in extent East and West, and 30 yards broad. A pinnacle about the size of a capstan dries 2 feet, the rest has 1½ to 2 fathoms water on it, with 5 fathoms close-to all round. The long weeds, with which the rock is covered, seem to prevent the sea from breaking, which it seldom does.

From Kingston to Cape Jaffa the land is very low; the coast line a sandy beach with a bank behind covered with trees, the tops of which are visible 7 to 8 miles off shore.

A sandy spit runs out from the beach 6½ miles S.W. from Kingston jetty; the deepest water on it is one fathom; a small portion dries. To clear it, do not bring cape Jaffa to the westward of S.W. by S. until a remarkable sand-patch on the bank above the beach, 1¾ miles E.N.E. from the north extreme of cape Jaffa, bears to the eastward of South.

Surf.—There is no surf between cape Jaffa and a position on the beach 3 miles North from Maria creek. At the latter place the sand-hills also commence and rise gradually to the N.W.; landing should not be attempted N.W. of this position.

Maria Creek, which empties itself into the sea just North of Kingston, is the means of escape for the accumulation of water in the swamps behind the township. The mouth is sometimes blocked up with weed, otherwise it is available for boats.

Kingston.—The township of Lacepede bay, 169 miles south-east of Adelaide, is situated close to the sea, on the banks of Maria creek, 10 miles from the Granite rocks, and 11 from cape Jaffa. The name of the port is Caroline. There is usually a weekly steam vessel calling here on her voyage between Adelaide and Melbourne; several small sailing vessels also trade regularly; also daily communication with Adelaide by coach. The railway between Kingston and Narracorte, a township 54 miles inland, in the middle of a large wheat-producing district, has been extended to

Bordertown, a further distance of 58 miles, and which, it is expected will soon be connected with the Victorian line of railways. The completion of this work will probably materially increase the trade, this port having the safest and most commodious anchorage between Melbourne and Adelaide. An iron jetty 4,000 feet in length, and having at its outer end 16 feet at low water has been erected. Six sets of screw moorings with hauling off buoys are placed alongside the jetty, but vessels are not to ride by them.

There is telegraphic communication with any of the colonies and Europe. The population in 1881 was about 300.

Supplies.—Provisions can be obtained at the stores, and water from the railway authorities in a tank, which is taken by lighter.

LIGHT.—A *fixed* white light is exhibited from a white iron tower, 25 feet above the sea, on the outer end of the jetty. The light is visible in clear weather for 10 miles.

CAPE JAFFA, or Bernouilli, S.W. 11 miles from Kingston, is a low sandy point extending one mile North and South. A wooded range rises near the southern part of it, which attains a height of 254 feet at mount Benson S.E. by E. 8½ miles from the cape. Three rocky ledges extend from the point; the extreme of the northern one is N.W. by N. 2 miles from the north point of cape Jaffa, having 3 fathoms there, with 1¾ just inside; the western ledge W. ½ S. a little above 2½ miles from the cape's western extreme, with depths from 2 to 3 fathoms over it; and the third or southern extends the same distance South from the southern part of the cape, terminating in an isolated rock with 3 fathoms water on it, and 6 fathoms outside. There are 4 to 6 fathoms water between the above-mentioned reefs; the sea breaks on all parts of them in an irregular and uncertain manner, making it dangerous for boats going over them. A rock dry at low water lies close to the south extreme of the cape.

There is good landing on cape Jaffa between the northern and western ledges, near where the lightkeepers cottages are built.

MARGARET BROCK REEF.—The rock on which the lighthouse stands is the only one above water of this extensive danger; it is awash at high water and bears W. ½ S. nearly 4 miles from cape Jaffa. The western extreme of the reef, a rock awash at low water, is N.W. half a mile from the lighthouse; the north rock, a little more than 1½ miles N. ½ E. from the same object, with 2 fathoms on it; and the southern breaker S. ½ E. 2¾ miles from the lighthouse with 2 fathoms, rock. There is another breaker with 2½ fathoms water on it, E. ½ S. 2 miles from the last, from which to the extreme of the reef running South from cape Jaffa, it is E. by N. about 1½ miles, with 6 fathoms between. Margaret Brock reef is not all connected, there being channels through parts of it with not less than 4 fathoms water; it is as well, however, to regard it as a whole, and not attempt to pass through it anywhere. There is a channel between the reef and cape Jaffa with 5 fathoms least water; it passes three-quarters of a mile East of the lighthouse, where it is only half a mile wide. It should not be attempted (as no advantage could be gained by using it) except by people well acquainted with the locality, when it might save time and distance in proceeding from Robe to Kingston or *vice versâ.* The extremes of this reef do not always break; there are 6 to 8 fathoms water close to all parts of it to seaward.

Owing to the uneven nature of the bottom, the sea often breaks in bad weather for a distance of 4 or 5 miles outside the outer rock with such violence as would jeopardize a small deep loaded vessel.

LIGHT.—Cape Jaffa lighthouse is an iron structure, 70 feet high, on the eastern part of the Margaret Brock reef; iron piles are screwed into the rock, supporting a platform on which the dwellings of the keepers are built, and from which the tube of the lighthouse, painted white, rises to a height of 100 feet above the sea. The light is white, of the first order, revolving *every half-minute*, and visible 16 miles.

DIRECTIONS.—In steering for Kingston it is always advisable to first make cape Jaffa lighthouse. Kingston may be found by a wide gap in the trees, there being none between the township and Maria creek; a large white store near the beach is conspicuous from the offing when the afternoon sun is shining on it.

At night, the lead and a bearing of cape Jaffa light with the light on the end of Kingston jetty, are sure guides.

From the N.W.—From 3 miles East of cape Willoughby steer S.E. ¾ E. 85 miles; when by night the light, or by day the lighthouse and high land S.E. of cape Jaffa, the former bearing S.E. by S., distant 11 miles, will be well in sight, and the depth 22 fathoms. From this position an East course will bring the jetty light in sight, and if continued will lead a vessel to the anchorage off Kingston, and one of S.E. by E. ¼ E. 12½ miles to that N.E. of cape Jaffa.

From the Southward or Westward.—In rounding the Margaret Brock reef do not shoal the water to less than 15 fathoms; this depth will be found rather more than 2 miles to seaward from any part of the shoal. With the lighthouse bearing East, distant 3 miles, steer N.N.E. until the lighthouse bears S.S.E. ¾ E. The north extreme of the reef will then bear S.E. by E. ½ E. 2 miles. From here to the anchorage off Kingston, is N.E. by E. ¼ E. 13 miles; and to that in the southern part of the bay, East 6½ miles, taking care with the latter to steer a northerly course, as the one given passes only one mile North of Margaret Brock reef, and the reef extending N.W. from cape Jaffa.

Bound Out of Lacepede bay and through Backstairs passage, a N.W. by W. ½ W. course may be steered for cape Willoughby from the anchorage off Kingston ; or, N.W. by W. from the anchorage near cape Jaffa.

If going to the southward,—from the outer anchorage near Kingston steer S.W. by W. ½ W. 14 miles, or until the lighthouse bears S.E. distant 4 miles, then South 7 miles, when the south extreme of the Margaret Brock reef will bear E. by N. ½ N. 3 miles, and the course may be altered to the southward and eastward. From the outer anchorage near cape Jaffa, steer West 6½ miles, or until the lighthouse bears S.S.E. ¾ E.; S.S.W. 3 miles, and South 4 miles, when the same position will have been gained as with the courses and distances given from Kingston.

In working in or out of the bay the lead and chart are the best guides.

There is no tidal stream in Lacepede bay, but both inside and outside Margaret Brock reef there is a strong set to the northward after easterly winds.

Anchorages.—The anchorage off Kingston for large vessels is with the inner end of the jetty bearing E. by S. rather more than 2 miles, in 4½ fathoms water, sand and weed. There is a bank with 2¾ fathoms on it half a mile S.S.W. from this position ; to the West and North the water is deeper. The inner end of the jetty bears from the south part of the bank mentioned E. by N. nearly 2½ miles ; there is good anchorage in 4 fathoms half a mile S.W. of this, with the inner end of the jetty bearing E. by N. ½ N.; it is, however, nearly a mile farther from it than the first-mentioned anchorage. Small vessels anchor in 2 fathoms, sand and weed, with the inner end of the jetty bearing E. by S., 6 or 7 cables off. Twice this distance off on the same bearing there are 3 to 2¾ fathoms. With a good scope of chain out a vessel may ride here in safety during a south-west or westerly gale.

The anchorage in the southern part of the bay, where vessels usually ship wattle bark, is for large vessels, with cape Jaffa S.S.W. nearly 2 miles, and the remarkable white patch on the bank above the beach S.E. ½ S., in 4½ fathoms water, sand; or for small vessels in 2½ fathoms, with the north extreme of cape Jaffa S.W. ½ S. 1¼ miles, and the white patch E.S.E. The bark is embarked from a position some distance West of the small jetty, where the beach is rocky and shelving.

There is a place 5 miles S.W. of Kingston jetty with 21 feet water, at three-quarters of a mile off shore, but the water is much shoaler towards the beach than at the white patch.

The surveying schooner *Beatrice* rode out at single anchor, a heavy west and south-west gale, in 3 fathoms water, with the white patch bearing E.S.E., and about the same amount of sea as would be experienced in the same depth off Kingston. With strong North winds the water is much smoother off Kingston, but the holding ground is not so good.

A vessel may anchor with safety according to her draught anywhere between Kingston and cape Jaffa, inside the 5-fathoms line by the chart.

TIDES.—It is high water, full and change, in Lacepede bay at 0h. 6m.; springs rise 5 feet. The time of high water is generally within an hour of noon and midnight for four days before, and the same time after a new and full moon; on the fifth or sixth day there is only one tide in 24 hours, about 18 hours elapsing between two successive high waters. The time of high water is then irregular and uncertain for 4 or 5 days, after which it returns again to near twelve o'clock. The remarks relative to the times of high water with reference to the moon's age, apply to all the ports on the south-east coast of South Australia. After several days' westerly wind the general level of the water in Lacepede bay is raised 3 to 4 feet, the ordinary rise and fall of tide remaining the same as usual.

Boatswain Point, S.E. by S. 8 miles from cape Jaffa, is the north point of Guichen bay, and has some sand-hills 74 feet high close to. The shore between it and cape Jaffa is low. Sand-hills attaining a height of 73 feet commence at cape Jaffa and continue for 3 miles to the S.E., there is then only a low bank as far as Boatswain point. The wooded range which rises at cape Jaffa is seen at the back, and passes 3 miles East of Boatswain point.

This part of the coast should not be approached; rocks and foul ground extend off, generally to a distance of 2 miles from the shore.

Sesostris Reef, reported in the "Sydney Gazette" to have been seen in 1826, was said to lie about 16 miles to the westward of cape Jaffa, which position nearly agrees with that of a reef on which the ship *Margaret Brock* was said to have been wrecked, at about West 18 or 20 miles from the cape; the ship *Rivals* being also reported to have struck on the same reef.

Caution.—So much doubt, however, exists as to the position and even the existence of this supposed danger, that it has been expunged from the Admiralty charts, but masters of vessels approaching this part of the coast should do so with caution, and be careful to ascertain the positions of their vessels before attempting to pass cape Jaffa, as the current sets round it to the north-eastward, and has a tendency to draw vessels towards Margaret Brock reef.

Baudin Rocks are a ragged and broken group stretching half a mile North and South; the highest, 30 feet, being S.W. ½ S. about 1¼ miles from Boatswain point. There is a narrow channel between the rocks and the point with more than 2 fathoms water in it, but the ground is foul.

Black Pigs, S. by W. ½ W., 2 miles from Boatswain point, and 7 cables S.S.E. from the South Baudin rock, are awash at half tide. A rocky reef with 2¾ fathoms on its extreme, extends half a mile towards them from the Baudin rocks, leaving a 4-fathoms channel 1½ cables in width between.

There are 4 fathoms water at 2 cables S.W. of the Black Pigs, and 6 to 8 fathoms close to the South and East of them.

Snewin Rock is of small extent, with 26 feet least water over it, S. by W. ½ W. 1¾ miles from the Black Pigs, and N.W. ½ W. nearly 2½ miles from the obelisk on cape Dombey, having 8 to 10 fathoms all round, and 15 fathoms a quarter of a mile West. It lies right in the mouth of Guichen bay, and only breaks when there is a high westerly swell, then seldom, but very heavily.

CAPE DOMBEY, the southern point of Guichen bay, is S. ½ E. 5 miles from Boatswain point, and may be easily distinguished by an obelisk, painted in red and white bands, on its western extreme. The top of the obelisk is 76 feet above the sea.

South Reef, composed of rocks awash with 2 to 3 fathoms water between, extends N.W. by N. more than half a mile from the north point of cape Dombey. The sea nearly always breaks on it, and the ocean swell sets towards it, the reef should be carefully avoided. There is a boat channel with 3½ fathoms between it and the cape, and 5 to 6 fathoms all round elsewhere.

GUICHEN BAY,* included between Boatswain point and cape Dombey, is 2½ miles in depth with soundings of 4 to 6 fathoms all over it. There is a rocky point E. by S. ½ S. three-quarters of a mile off Boatswain point, from which a sandy beach with a low bank behind runs to the southward for 6 miles, the coast then takes a westerly direction for 2 miles to cape Dombey, being composed of rocky points and sandy bays, with rocks uncovered at low water extending a short distance off. A wooded range about 200 feet high and 4 miles inland, is seen to the westward of the bay.

Robe Town, situated three-quarters of a mile S.E. of cape Dombey, has a jetty 340 yards long, with a rocky reef to the westward, and 10 feet at the end of its east side. There are two cranes on the jetty. Vessels cannot go alongside, but boats can generally load at it. There are moorings in 8 fathoms, off the jetty, for the steam vessel calling here weekly between Adelaide and Melbourne, by which means the principal part of the trade is carried on. Robe town is 195 miles S.E. of Adelaide, with which place it is in telegraphic communication. The population of the district in 1881, was about 600. The climate is considered salubrious.

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* *See* Admiralty plan, Guichen bay, No. 1,006 ; scale, *m* = 2 inches.

A life-boat is attached to the port; and a rocket apparatus for saving life from wrecked vessels at cape Dombey,

Supplies.—Fresh water and provisions may be obtained.

DIRECTIONS.—No vessel should attempt to enter Guichen bay at night.

From the Northward, having passed Margaret Brock reef, do not bring the lighthouse on it to the westward of N. by E. until the northern wooded hill near cape Jaffa bears E.N.E. Then steer S.E. by E. ½ E. until One Tree hill, which is the north-western summit of a low range 120 feet high, and 2 miles S.E. by E. from cape Dombey, bears S.E.; or is in line with the first rocky point East of Robe jetty. This leading mark clears the Black Pigs, Snewin rock, and South reef; passing one mile south-west of the first, and half a mile north-east of the second danger. It should be kept on until cape Dombey bears South, which leads a quarter of a mile to the N.E. of South reef, then steer S.E. by E. ½ E. for the anchorage, or for the south extreme of the long sandy beach at the east side of the bay.

From the Southward, do not approach within 2 miles of the coast until cape Dombey bears E.N.E. From the position with the cape on that bearing and distance, steer N.E. by N. until the leading mark given above is on, then proceed as before. The leading mark given is the only practicable one for clearing the dangers about the bay.

When working in or out, bearings of the points are the best guides for clearing the rocks and shoals. Bound out to the northward, steer out with the leading mark on until the Baudin rocks bear East, then haul to the westward, as the previous course (N.W.) leads directly on to the south breaker of the Margaret Brock reef. To the southward, keep the leading mark on until the obelisk bears S.S.E., then steer S.W. until sufficient distance off-shore to alter course to the S.E.

Anchorage.—The anchorage is in 4 fathoms water, fine sand, with the extreme of cape Dombey W. by S. ½ S., and the jetty end S.S.W. During the first five months of the year when south-easterly winds prevail it is safe to anchor in Guichen bay; with N.W. and Westerly winds, the season for which is from June to December, the anchorage is unsafe. Vessels should proceed to sea in time on the approach of a N.W. gale, of which the barometer usually gives ample warning. They sometimes occur in the early part of the year.*

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* Storm signal:—A blue flag will be hoisted, on the indication of bad weather.

A good scope of chain should be veered at once, and a second anchor ready to let go in the event of bad weather.

Small vessels, in the winter season, should carefully avoid anchoring too close to a rocky point at the eastern end of the town, as, in the event of their wanting to veer cable, such a position might be inconvenient.

TIDES.—It is high water, full and change, at Guichen bay at 0h. 37m.; springs rise 4 feet.

The COAST from cape Dombey takes a southerly direction for one mile to a point (cape Lannes), with some rocks above water off it, and a reef running out one mile to the westward. From this point the coast trends to the S.E. in an almost straight line to the north point of Rivoli bay.

Bishop's Pate, 110 feet high, is a round bare sand-hill near the coast, 5 miles S.E. from cape Dombey.

Rabelais peak is a pointed and conspicuous sand-hill, 157 feet high, close to the shore, 11 miles from cape Dombey. The coast between the peak and the cape is alternate rocky points and sandy bays, with sand-hills somewhat over 100 feet high behind; rocks uncovered at low water, and isolated patches always covered, extend from a quarter to one mile off shore. The sea breaks heavily on the rocks and beaches; landing is impossible.

Nora Creina Bay is a small opening in the coast under Rabelais peak; a boat may go inside where there is landing; the attempt to get in would generally be attended with danger, as it sometimes breaks right across the entrance of the bay.

CAPE MARTIN, 82 feet high, the north point of Rivoli bay, is S.E. ½ S. 24 miles from cape Dombey. The features of the coast are the same as between cape Dombey and Rabelais peak. From Nora Creina bay a reef runs nearly parallel to the shore for 6 miles to the S.E., its greatest distance from the beach being 1½ miles, which is at its south-east extreme. For 3 miles South of this and to a distance of 3 miles off-shore there are very irregular soundings, from 5 to 12 fathoms, causing heavy rollers and overfalls when the swell is high. Above the beach at the point where the reef ends are a collection of bare sand-hills, the highest 108 feet, conspicuous from the southward. Between here and cape Martin the sand-hills are somewhat higher and not so bare. There is a green point 5 miles N.W. from cape Martin, with a wooded hill 153 feet high at the back. From this point to cape Martin the coast is more cliffy, with foul ground, on which the sea generally breaks, extending off to an average distance of one mile.

Caution.—Do not shoal the water to less than 20 fathoms at night between Guichen and Rivoli bays; this will ensure being at least 5 miles off shore. The average depth is 12 fathoms 2 miles from the shore, and close to danger.

Inland Hills.—A wooded range, which may be seen above the sand-hills on the coast, a greater distance than 5 miles off shore, runs parallel to the coast. The highest part of the range, a hill elevated 252 feet, is N.E. by E. ¾ E. 5 miles from Rabelais peak.

Salt Lakes.—Between the range and the coast sand-hills, and extending from Guichen to Rivoli bay, are 4 large salt lakes, varying from 2 to 18 feet in depth ; the bottom is limestone under soft white clay, the latter sometimes 2 feet thick. During the early part of the year they are frequented by great numbers of black swans, mountain ducks, and seals. Kangaroos are very numerous on the sand-hills between the lakes and the sea.

Lake George, at the north end of Rivoli bay, approaches within 300 yards of the coast. Eastward of lake George, and close to the beach, are a range of sand-hummocks, 60 feet high.

RIVOLI BAY* is an indentation near the middle of the sandy coast extending from cape Lannes, Guichen bay, to cape Banks. The sameness in character of the coast feature northward and southward of Rivoli bay is such that when seen from an offing a vessel would have difficulty in making the anchorage unless certain of her latitude.

Landing is safe and easy on the beach North of Glen point to within 200 yards of the fence. A well of good water may be found about 200 yards N.W. of Glen point, and about fifty yards from the beach.

The south end of Rivoli bay has been selected for the site of a small township, Grey Town. At present few people reside here. They live in tents and temporary huts near the beach, and are engaged in collecting and carting wattle bark from the interior. The only conspicuous house is built on some rising ground near the end of the beach.

Extensive drainage works have been in progress to the south-east of Rivoli bay for many years, and the produce of the drained land will most likely be shipped from thence.

Soundings may be obtained outside Rivoli bay, and from 4 to 5 miles off shore, in 20 fathoms rocky bottom, with occasional broken shells.

From cape Martin, cape Buffon, the south-east point of Rivoli bay, bears S.E. by E., distant nearly 6 miles, the depth of the bay from this line of bearing being about 2 miles near the north part, and 1¼ miles near the south extreme.

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* *See* Admiralty charts :—Australia, South coast, Sheet IV., No. 1,062 ; scale, $m = 0 \cdot 25$ of an inch ; Guichen bay to Glenelg river, No. 1,015 ; scale, $m = 0 \cdot 25$ of an inch Anchorages in South Australia, No. 1,007 ; scale, $m = 2$ inches.

Penguin Islet.—The south-eastern extreme of cape Martin is formed by this small rocky islet, extending N.W. and S.E. nearly a quarter of a mile, with an average width of 150 yards; it is 54 feet high at its north-west end, near which it is perpendicularly cleft down to the water's edge. This cleft is open to the eastward and westward, and is a good mark for making cape Martin.

LIGHT.—A revolving white light showing *a flash every ten seconds* is exhibited at an elevation of 70 feet above the sea, and visible 12 miles, from a tower erected on Penguin island. The tower and keepers' dwellings are painted white.

Glen Point.—Inside Penguin islet the coast of Rivoli bay trends to the northward, and forms a small sandy bay, which is shoal with rocky patches. The north point of this bay, Glen point, is rocky, and bears North 6 cables from the south end of Penguin islet. From Glen point the beach extends in front of Beachport northward nearly three-quarters of a mile, and then trends to the eastward and south-eastward 7 miles, thence curving south-westward about 2 miles; this part, with cape Buffon, forming the south end of Rivoli bay.

A large rock awash, lies N. by E. ½ E. 4 cables from the south point of Penguin islet, and 2 cables S.S.E. of Glen point, with rocky ground, extending 400 yards to the eastward of Glen point.

Several rocks skirt the south point of Penguin islet, and with a heavy swell the sea breaks in 5 fathoms water a cable S.E. by E. of the point.

Buoy.—A black buoy with a staff and ball is moored in 16 feet off Glen point, with the point bearing N. 64° 40′ W., and the south end of Penguin island S. 36° W.

Beachport is pleasantly situated in the N.W. part of Rivoli bay on elevated ground. It was only founded in 1878, and has made rapid progress, being the outlet for the produce of a large district. There is a railway to mount Gambier, and telegraphic communication with all parts. An iron jetty, 2,563 feet in length, runs off from the northern part of the town, and mooring buoys for hauling off to are to be placed.

LIGHT.—A *red fixed* light is shown from the outer end of the jetty, and is visible 5 miles.

Signals.—A black ball will be hoisted during the day, and a *fixed* white light exhibited at night, at the mast head of the flagstaff adjacent to the harbour master's residence at Beachport, northern side of Rivoli bay, to denote that steam and sailing vessels must not come to the jetty.

Lifeboat.—A lifeboat with crew; and a rocket apparatus are stationed here.

CAPE BUFFON is cliffy, 35 feet high, projecting from the line of coast about half a mile to the north-west. The coast line, to the southward of cape Buffon, is rugged and broken for nearly 4 miles, with many outlying rocks, and backed by sandy hills covered with scrub. The bare sand is not so conspicuous from seaward as at the north-west end of the bay.

The land rises gradually from cape Buffon, and at 3 miles from the cape attains a height of 200 feet. A range of low wooded hills runs parallel to the coast from 2 to 3 miles back from the beach, rising to a height of from 150 to 180 feet. Between this range and the beach the land is low and sandy, with swamps near the hills.

Lake Frome, the waters of which are fresh, lies about one mile East of the south end of Rivoli bay. Fresh-water swamps extend from it towards the beach nearly half a mile.

Ringwood Reef.—The central part of Rivoli bay is dangerous to navigation from the numerous reefs and rocky patches. The outer reef, Ringwood, lies a mile outside the line joining cape Martin and cape Buffon. It extends East and West one mile, and 400 yards North and South; the eastern end is thickly covered with long kelp. Some part of this reef is always breaking. The western edge, in 3 fathoms, lies 2 miles nearly S.S.E. from Penguin islet, and W. by N. ½ N. 4½ miles from cape Buffon. During bad weather it breaks in 5 fathoms water about 100 yards to the westward of the reef.

Ringwood reef is detached from the mass of rocks and reefs lying to the northward and eastward by a channel with from 5 to 8 fathoms water. On its western and south-western sides, the reef shoals suddenly from 7 and 8 fathoms, which is the general depth across to cape Buffon.

Glen point in line with Penguin islet bearing North leads outside Ringwood reef in 9 or 10 fathoms, and cape Buffon bearing E. by S. clears this danger to the southward.

Lipson Rock lies S.E. by E. ½ E. 1¼ miles from Penguin islet, and is just awash at high water, extending about 250 yards N.E. and S.W. with a breadth of about 100 yards. The ground is foul and rocky with from 9 to 18 feet water for one-third of a mile to the N.W., and one mile S. by E. from Lipson rock; in the finest weather there is a break on the south-west side of the rock, and, with the ordinary swell, breakers extend over the foul rocky ground in from 9 to 18 feet water.

West Rock is the outer danger on the south side of the channel leading to the anchorage off Beachport. West rock is of small extent, with 17 feet water on it, but breaks heavily at times. It lies North nearly one mile from the west end of Ringwood reef, and S.E. by S., 1⅛ miles from Penguin islet.

A small rocky patch, with 4½ fathoms on it, lies 2 cables North of West rock, and breaks at times with a heavy swell, when also breakers extend from West rock to Lipson rock.

De Mole Reef lies in the north part of Rivoli bay, E.N.E. one mile from the south point of Penguin islet, and N. by W. ½ W. a little over one mile from Lipson rock. This reef has 15 feet over it, with 4 fathoms, sand, close to its south-western side. North-eastward of De Mole reef are some straggling rocky patches, with from 16 to 18 feet. The sea breaks in a moderate swell on De Mole reef and the adjacent patches, and in a south-west gale or heavy swell, breakers extend from De Mole reef to the beach.

Northern Anchorage.—In the entrance to the northern anchorage of Rivoli bay the soundings are from 11 to 8 fathoms, with Penguin islet bearing N.E. about one mile; and 8 to 6 fathoms, with the islet bearing N.W.; between the islet and De Mole reef the water suddenly shoals to 4 fathoms, when the south-east point of the islet bears W. by S. ½ S., and 2 cables farther north to 3 fathoms, which is the greatest depth between Glen point and the shoal water N.W. of De Mole reef.

During a heavy swell, with strong breeze from south-west to south-east, the whole of the space included between Penguin islet, Glen point, and De Mole reef, breaks in detached patches, and in a gale, continuously.

When Glen point bears southward of W. by S. distant about half a mile, and the fence on the beach bears about N.W. by N., the depth increases to 3½ and 4 fathoms; but this patch of comparatively deep water is small; only about 800 yards North and South and 400 yards East and West, with 17 feet water to the eastward, and shoaling gradually to 9 feet about 300 yards from the beach, inside which distance the soundings are irregular.

This anchorage is safe for a limited number of vessels, drawing less than 15 feet, with Glen point bearing to the southward of W.S.W., and the fence bearing from N.W. to N. by W., or south point of Penguin islet bearing southward of S.S.W. ½ W. Here the sea never breaks, and the bottom, a firm, white, marl-like clay, is good holding ground.

Sherbet Rock, lying E. by S. ½ S. from Lipson rock 1½ miles, and 1¼ miles S.S.W. from the nearest part of the beach, is a small heap of stones, 6 feet above high water, in the middle of a rocky patch which is awash, about 150 yards long by 100 yards broad; this again is surrounded by a large rocky shoal, extending one-third of a mile to the north-east, and half a mile to the southward of the rock.

There is a small rocky patch of 3 fathoms, which does not break, midway between Sherbet rock and the beach.

There are also six rocky patches, of about 3 fathoms, lying between S. by E. and S.E. by E. of the Sherbet rock. The southern ones extend 1½ miles, and the south-eastern ones 1¾ miles from the rock. The line of shoals S.S.E. from the Sherbet rock break heavily with an ordinary swell, and those S.E. from it only at times with a heavy swell.

There is a 2-fathoms rocky patch, rather more than half a mile S.W. by W. of Sherbet rock, which breaks in ordinary weather. Also two 15-feet patches, one 6 cables N.W. ½ N., the other N.W. ½ W. 1½ miles from Sherbet rock. These patches each extend 3 cables, and do not break in fine weather, being protected by the shoal water round Lipson rock.

From Ringwood reef to near cape Buffon the bay is strewn with a growth of long kelp, which reaches the surface from a depth of 9 or 10 fathoms.

The Beak is a dangerous reef lying off cape Buffon, on which the sea breaks heavily. The north-western and outer end of it is S.W. three-quarters of a mile from cape Buffon. The line of breakers extends nearly half a mile parallel to the coast in fine weather, and with a heavy swell extends right along the rocky coast to the south-eastward, and about 6 cables off shore.

There is a patch of from 4¾ to 5 fathoms, and 400 yards in extent, lying W. by S. 1¾ miles from cape Buffon, which breaks heavily, at times. Between this patch and the Beak reef is the best channel into Rivoli bay during rough weather.

Shoal water extends nearly 2 cables to the northward from cape Buffon, for a mile to the eastward of it, and the same distance north of the west end of the beach. The general depth outside this shoal water is 15 feet to half a mile off shore, outside which the water deepens quickly to 3½ and 4 fathoms.

The Southern Anchorage in Rivoli bay is sheltered by the land from North round by east and south to S.W. From North to W.N.W. it has the partial shelter of the distant north end of the bay and the outer reefs, but between W.N.W. and S.W. by W. it is entirely open to the ocean swell. In fine weather, or off-shore winds, this anchorage is comparatively smooth, the prevailing south-west swell being broken by the Beak reef, and by the shoal water off cape Buffon.

During summer months, when strong south and south-east winds blow for weeks together, this anchorage is smoother than the northern one.

DIRECTIONS for the Northern Anchorage.—If bound for the northern anchorage, bring the south-east point of Penguin islet to bear N.E. when distant about 2 miles, and steer N.E. by E. ½ E., or so as to give the point a berth of about half a mile. Gradually haul to the northward and leave the buoy off Glen point on the port hand at a distance of 2 cables.

By Night.—Vessels approaching Beachport at night, after passing Penguin island at the distance of about half a mile, should not steer towards the jetty until the red light bears N.W. by N.

The best anchoring position for vessels drawing over 12 feet is Glen point in line with a low gap in the sandy bay north of Penguin islet, bearing S.W., and the fence on the beach between N.W. by N. and N.W., in from 3 to 4 fathoms, marl. The depth alters quickly.

For working in, no good directions can be given, the chart, lead, and look-out being the best guides.

Vessels can navigate the bay inside the reefs, by keeping parallel to the coast and about three-quarters of a mile off shore. If coming from seaward past cape Martin to run down inside the reefs, bring the south-east point of Penguin islet to bear W. ½ S., and steer in E. ½ N., passing 2 cables to the southward of De Mole reef, in 5½ fathoms. When Sherbet rock bears S.S.E. keep parallel to the coast.

Working inside the reefs, it is best to make short tacks within a mile of the beach, which can be approached to within one-third of a mile in 3 or 4 fathoms, except to the northward of De Mole reef, where a long tongue of rocky ground stretches out towards the reef.

The long stretch of beach between the north and south ends of the bay has much surf on it, extending fully a quarter of a mile off shore.

For the Southern Anchorage.—The best course is to bring cape Buffon to bear N.E. or N.E. ½ E., and steer for it until within 2 miles; then haul a point to the northward, passing West, one-third of a mile from the Beak, in 9 fathoms, and the same distance West of cape Buffon. When the extreme of the beach bears S.E. haul up East for the anchorage.

The best anchorage is with cape Buffon bearing S.W., distant half a mile, and the house in line with the left fall of a bluff wooded sand-hill, bearing S. by E., in 3½ fathoms water, marl. The holding ground here seems as good as at the north end of the bay. Small vessels can anchor in 2½ fathoms, with the cape bearing W.S.W., and the house S. by E.

There is no surf at the west end of the beach, the approach being shallow; but the landing is good for more than a quarter of a mile along the beach.

In a gale from West to W.S.W. the swell rolls directly into the southern anchorage. A vessel caught at anchor in one of these gales would have to remain and trust to her ground tackle, as it breaks in heavy rollers across the entrance. In the event of the weather and state of the barometer indicating the approach of a westerly gale, it is advisable to get under way and make for the northern end of the bay. These gales are uncertain, but are not likely to occur in the summer.*

The southern anchorage, though not so safe as the northern, is easier to approach, and can be used by vessels of greater draught of water.

Current.—In the south end of the bay no current was felt; but at the northern end of the bay a set to the southward, of about half a knot an hour, was experienced at times.

Outside the bay the current seems to be influenced by the wind, setting strong to the southward during and after strong north or north-west winds, and *vice versâ.*

TIDES.—It is high water, full and change, at Glen point at 0 h. 33 m. The spring tides rise 4 feet in fine weather, but the height is influenced by the wind. The time of high water at neaps and height of the tide at that period are uncertain, there being only one tide every twenty-four hours for several days.

The COAST.—Between Rivoli bay and Carpenter rocks the coast is nearly straight. From cape Buffon to 4 miles South of it, the hills above the shore are wooded and attain a height of 197 feet. S.E. of this, the coast hills are sandy and of less elevation; the most conspicuous is a sand-hill 145 feet high, 9¼ miles from cape Buffon. From cape Buffon the shore is cliffy for 5 miles to the S.E., with rocks uncovered at low water extending off a quarter of a mile except the Beak. There is then a sandy beach for 8 miles, which is steep-to, with the exception of a rocky patch with less than one fathom water on it, lying S.E. by S. 1⅓ miles from the north extreme of the beach, and half a mile off shore. From the south end of this beach to the Carpenter rocks, 11 miles, the shore is sandy, with here and there rocks above water a short distance off; a reef, on which the swell breaks, fronts the beach for the whole of this distance; N.W. by W. 2 miles from the Carpenter rocks, it extends as far as one mile off shore. It was at this spot that the steam vessel *Admella* was wrecked in 1857.

Inland Hills.—The best way to obtain a vessel's position off this part of the coast is by bearings of the following hills, which stand up boldly from the low surrounding country, and are visible above the coast sand-hills when at a greater distance than about 3 miles off shore. Their bearings and distances from cape Buffon are as follows: mount Muirhead, 492 feet high, which stands by itself and is the northern one, E. ¾ N. 14 miles; mount Burr, 802 feet high, East 17½ miles; mount Lookout,

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* The brig *Emily Smith* discharged cargo during March 1871, riding out a strong breeze, of about six hours' duration, from N.N.W. to W.N.W.; but the water remained comparatively smooth, and there was not much break on the reefs.

709 feet high, E. by S. ¼ S. 21 miles; and the Bluff, 703 feet high, which has a very steep fall on its southern side, E. by S. ½ S. 24 miles. The last three occupy respectively the north, centre, and south parts of a connected range.

Caution.—Commander Lipson advises special care and attention to the navigation of the coast between capes Martin and Northumberland, the prevailing winds being from the S.W. A continual swell sets on the coast, which, together with an uneven bottom, produces an irregular sea, that in the event of a vessel being obliged to carry sail off the land, the wear and tear would be excessive.

Carpenter Rocks are two black rocks above water, a short distance off a point S.E. ½ S. 23½ miles from cape Buffon.

CAPE BANKS is a rocky point 50 feet high, S.E. 1¼ miles from the Carpenter rocks. Between the rocks and the cape is a little bay, with a reef across the entrance, and one off the beach in it. There is a sand-hill 125 feet high at the back of the bay. S. by E. rather more than 2½ miles from cape Banks is a rock with 5 fathoms water on it, which breaks heavily with a high S.W. swell; there are 15 fathoms close to seaward, and 6 to 7 inside.

LIGHT.—A lighthouse has been erected on Carpenter rocks point near cape Banks, and adjacent to Carpenter rocks. The light is 92 feet above the sea, and is *revolving*, showing alternately one *red* and two white lights at intervals of *twenty seconds* each. The white light should be visible in clear weather for a distance of about 10 miles, and the red light for 8 miles.

Douglas Point is a green point 76 feet high, S.E. by E. ¼ E. 11 miles from cape Banks. Off the point there are 10 fathoms half a mile to the S.W. The coast between is low and sandy, the highest part being a sand-hill of 105 feet, 5 miles from Douglas point. Isolated rocks and reefs extend to an average distance of one mile from the beach. At about 3 miles S.E. of cape Banks are two rocks, which from seaward appear as two islands; they are part of the mainland, and form a cove where two small vessels might lie.

Middle Point, with a bare sand-hill for its summit, 55 feet high, lies 2 miles E. by S. from Douglas point. The shore is low between the two points, with only one sand-hill on it, at three-quarters of a mile to the N.W. of Middle point. S.E. by S. 8 cables from Middle point is a reef, a quarter of a mile in extent North and South, with less than one fathom on it. Rocks uncovered at low water extend half a mile off on either side of this point, and nearly a mile off between it and cape Northumberland.

Soundings.—Between cape Buffon and cape Banks 10 fathoms will be found at an average distance of one mile from the shore, between cape Banks and Douglas point at 3 miles off, from Douglas point to cape Northumberland at one mile, and between cape Northumberland and the Glenelg river at 2 to 4 miles from the shore, being farthest off south of Danger point. Between capes Buffon and Northumberland 25 fathoms will be found at an average distance of rather more than 5 miles from the coast, over a rocky bottom.

CAPE NORTHUMBERLAND, S.E. by E. ¾ E., nearly 2¼ miles from Middle point, is rugged and cliffy, about 100 feet high, with a hill behind it rising to 138 feet, and several detached rocks lying close to it. It may be easily distinguished by the lighthouse. Mounts Gambier and Schanck are also excellent marks to recognise it by.

For a mile from Middle point towards cape Northumberland the shore is low, with a swamp behind, sand-hills then commence and continue to the cape.

LIGHT.*—The lighthouse erected on a knoll on cape Northumberland, is painted from base to lantern with three bands,—white, red, and white. It exhibits from a height of 150 feet above the sea, a *revolving* light showing a *bright flash every sixty seconds*, and should be visible in clear weather from a distance of 20 miles.

Telegraph.—All vessels passing cape Northumberland lighthouse during the day, and wishing to be reported, will, on showing their numbers, be telegraphed to Adelaide and port Adelaide free of expense.

In consequence of the difficulty in making out the answering pennant, a round ball with the answering pennant underneath will be used at the signal station, instead of the answering pennant only.

The lighthouse is also connected with port Macdonnell by a telephone.

During hot weather and north-east winds, when there is often much refraction, the light will be frequently observed at a great distance.

The light-keepers are provided with a gun, and code of signals, to warn vessels, if observed standing into danger.

Rocket apparatus for saving life from shipwreck is kept here.

DIRECTIONS.—Vessels approaching cape Northumberland by night from the north-westward, ought never to sight the light on a bearing more southerly than E. ½ S., and should alter the course more southward in good time, so as to give a wide berth to the outlying reefs westward of the cape, which run parallel with, and extend a mile off shore.

Vessels approaching the cape from the eastward should not bring the light to bear to the westward of W.N.W., nor approach the light on that bearing but should steer more southerly, to give a wide berth to the reef which stretches to the eastward from cape Northumberland.

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* *See* Admiralty charts :—Glenelg river to cape Otway, No, 1,062 ; scale, *m* = 0·25 of an inch ; Guichen bay to Glenelg river, No. 1,015 ; scale *m* = 0·25 of an inch ; and Bass strait, western approach, No. 1,063 ; scale *m* = 0·19 of an inch.

In bad weather, with the wind hanging from the southward, the lead should be carefully attended to. Several vessels have been wrecked between cape Northumberland and the south end of Rivoli bay.

The coast to the north-westward of cape Northumberland soon becomes low, and owing to the heavy ocean-swell which sets directly on the shore should be very carefully avoided.

Kelp.—Between cape Banks and cape Northumberland, and from one to 4 miles off shore, there are forests of kelp, the tops of the plant trailing a long distance on the surface of the water; it does not appear to grow where the depth is greater than 15 fathoms. Steam vessels have been obliged to stop to clear their screws of the accumulated weed. There is a quantity of it in Rivoli bay between the Ringwood reef and cape Buffon, but it is not in the way of vessels passing along the coast; and there are patches of it which look like rocks, where there are 10 fathoms, to the westward of Margaret Brock reef.

Fish.—Barracouta are very plentiful in the waters between cape Jaffa and cape Northumberland; they are easily caught when in more than 20 fathoms, and with the vessel going from 4 to 6 knots.

Breaksea Spit, the south extreme of which is S.E. by E. 2 miles from cape Northumberland, is a dangerous rocky reef, extending 1½ miles East from the cape and the same distance off shore. There are less than 2 fathoms on most of it, and the sea generally breaks all over it with great violence. To clear it to the southward and westward keep the sand-hill on the beach between Middle and Douglas points well open to the left of cape Northumberland N.W. ¾ W., until the Custom-house at port Macdonnell bears to the westward of North; and from the eastward the Custom-house should not be brought to bear east of North until the sand-hill is well open of cape Northumberland. There are 11 fathoms water half a mile S.W. from cape Northumberland, and 5 to 6 fathoms close to the south-west edge of the Breaksea spit.

MACDONNELL BAY,[*] is a very slight indentation of the coast, extending E. by N. about 4 miles from cape Northumberland, and affords shelter from north-westerly and northerly winds, within Breaksea spit.

Port Macdonnell being near to the most fertile portion of the colony, and connected with it by good roads, is one of the principal trading ports of the south-east districts of South Australia, and is situated on the shore, 2 miles to the eastward of cape Northumberland. There is a considerable export of wheat, flour, wool, potatoes, ground bark, and dairy produce. The population in 1881 was about 440. There is telegraphic communication with Adelaide and the Colonies. A coach runs to and from Adelaide.

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[*] *See* Admiralty plan of port Macdonnell, No. 1,007; scale, $m = 2$ inches.

A steam vessel calls weekly between Adelaide and Melbourne, and there is a large trade by small vessels between the port and Melbourne. Vessels trading regularly are especially fitted with hawse-holes large enough to take in the mooring chain, and are provided with hawsers to be used as springs when there is much swell.

Bonded and free stores have been established; and provisions, water, and ships' stores can be procured. There is a convenient jetty, 1,000 feet long, with trucks and cranes, and having at its outer end 5½ feet at low water, in the most sheltered part of the bay. The lighters are fine sailing boats, carrying about 15 tons of cargo.

Moorings.—There are five sets of moorings with anchors of 80 cwt. in 2½ to 3 fathoms at low water; these represent the total possible accommodation in water varying from 14 to 17 feet for shipping at port Macdonnell, for with a S.W. swell coming in it breaks everywhere else for miles round. The centre of the moorings is E. ¼ N. 2¾ miles from cape Northumberland lighthouse. Vessels parting from the moorings usually run on shore due North from them, and generally get off uninjured when the water has smoothed down.

Pilots.—Before approaching the coast, strangers should hoist the signal for a pilot, who will come off in favourable weather. Should the pilot not be able to board, it is recommended to maintain an offing until the weather moderates. Pilotage at port Macdonnell is compulsory.

DIRECTIONS for Port Macdonnell.—It is necessary to have daylight to enter. From the westward, with cape Northumberland North 2 miles distant, steer E. ½ N. until mount Gambier is seen over the right or eastern fall of mount Schanck bearing North, the depth will be then 6 fathoms. Go in with the above leading mark on, it leads directly to the moorings, the water gradually shoaling; 13 feet will be the least passed over, which depth is 2½ cables, a little to the westward of South, from the outer moorings. This may be avoided by hauling a little to the eastward when half a mile from the moorings, and steering for them when they bear N.N.W. From the eastward do not approach the shore nearer than 3 miles until the leading mark given above is brought on, then proceed as before stated.

In going out, if the wind is from the southward the first board should be made to the eastward, if the vessel will lie E.S.E., or to the southward of it. If obliged to cast to the westward, a vessel should not stand in a S.W. or westerly direction for more than half a mile. S.S.W. made good, clears Breaksea spit, and leads in safety out to sea. The best course, if practicable, is to go out with the leading mark on for 3 miles, by so doing passing through the smoothest water obtainable; a vessel will then be in 10 fathoms, clear of all breaks and dangers, and may proceed either to the eastward or westward. The chart will be a good guide.

In the event of all the moorings being occupied, vessels entering the bay must anchor; and should be kept in such a condition, as to ballast and trim, as will enable them to seek an offing in the event of bad weather coming on.

Although the moorings now laid down at this port are of the heaviest description, and fully competent to hold any vessel that can enter Macdonnell bay it must be remembered that, during and directly after, heavy south-west gales, the sea rolls in over the outlying reefs, breaking heavily in the bay, and in 7 to 9 fathoms to the southward of the port.

It is obvious, from the nature of the bottom, that no vessel can be considered safe in bad weather from the westward, if at her own anchors.

The harbour master has coir springs for the use of vessels in bad weather.

By Night.—Vessels should not enter the bay at night without a pilot, but keep the light bearing from N.N.W. to N.N.E., taking care not to come under 25 fathoms water, or about 5 or 6 miles from the cape.

To Moor.—The direction and position of the mooring anchors and chains will be duly pointed out, and instructions given to masters of vessels in mooring and unmooring by the harbour master or pilot.

In case of the weather being such as would render it improper to take hold of the large buoy, ships must let go an anchor, clear of the direction of the mooring chains at the bottom.

TIDES.—It is high water, full and change, at port Macdonnell at 0 h. 2 m.; springs rise 4 feet.

Signals.—The flagstaff at which the signals will be displayed is situated near the base of the jetty.

A blue flag is hoisted by the harbour master at the flagstaff, when he deems it unsafe for vessels in the offing to come in and moor; or for boats to land from vessels at the moorings.

A Lifeboat and Rocket Apparatus are in readiness in case of accident, and there is a pilot boat with coir springs, available for vessels riding in Macdonnell bay. In the event of shipwreck near cape Northumberland, and the lives of the crew being in danger, assistance will, if possible, be rendered.

Mounts Gambier and Schanck are two conspicuous hills, standing up alone, inland from this part of the coast. Mount Gambier, 630 feet high, a peak, with table land attached which extends to the eastward of it; and mount Schanck, a truncated cone, elevated 380 feet Both are extinct volcanoes. There are four lakes in the crater of mount Gambier; the eastern one, known as the Blue lake, is 160 fathoms in depth. and about half a mile in diameter any way. The crater of mount Schanck is dry. The former is N. by E. a little easterly, 14 miles from cape Northumberland, the latter N. by E. ¾ E. 8¼ miles from the cape.

The COAST.—Flint Point, E. ¾ N. 5 miles from cape Northumberland, is very low, and fronted by rocks and heaps of stones dry at low water. There are 3 fathoms more than a mile South of it. From cape Northumberland to this point the shore is low, a sandy beach with a bank behind, and except from port Macdonnell jetty to 2 miles to the eastward of it, fronted by extensive rocky ledges dry at low water. A low wooded range runs in a north-easterly direction 1½ miles from cape Northumberland; elsewhere the country at the back of port Macdonnell is swampy for more than a mile inland. The swamps discharge themselves into the sea by Cress creek, the mouth of which is nearly one mile East of the jetty.

Danger Point, N.E. by E. ¾ E. 1¾ miles from Flint point, is also low, with fresh water swamps at the back. The indentation between Danger and Flint points called Brown bay, is shallow; a rocky reef, with 3 fathoms on its extreme, extends S.S.E. 1½ miles from Danger point. A range of wooded hills, which continues to the Glenelg river, commences N.W. by N. 3 miles from Danger point, with an elevation at that spot of 125 feet. Moorak creek, a fine fresh water creek discharges itself into the sea close to Danger point, when there is no ocean swell on, a boat may run into the mouth of the creek, and fill water casks from alongside.

Green Point, 50 feet high, E. ¼ N. 3¼ miles from Danger point, is named from its verdant appearance. There is a sandy beach between it and Danger point, forming Riddoch bay, and a range of sand-hills, the highest 70 feet, commences in the bight of Riddoch bay and extends to Green point.

Landing.—Butte reef with 2 feet on it, having deeper water inside, makes landing practicable on Green point in ordinary fine weather, when there is a swell outside.

Ruby Rock, East 12 miles from cape Northumberland, and nearly 2 miles offshore, has 3 feet on it at low water, and during south-east and easterly winds seldom breaks, with the sun ahead, no indication of the rock would be experienced, unless due attention to the lead and bearings was paid. There are 2 to 3 fathoms in an E.S.E. direction 3 cables from the rock, 8 fathoms close to seaward and 4 fathoms directly inshore of it; no leading mark can be given for clearing it. There are 16 fathoms 2 miles, and 20 fathoms 4 miles South of it.

By night, should the light be obscured Ruby rock may be avoided by keeping outside 10 fathoms water.

VICTORIA.

The colony of Victoria lies between the parallels of 34° and 39° South, and the meridians of 141° and 150° East, and is bounded on the north by Murray river. The extreme length of the colony is 480 miles, its breadth 240, and it contains about 88,000 square miles, with a total population according to the census of 1881, of 849,434 persons.

Glenelg River, which discharges itself into the sea at the boundary of South Australia, is E. ½ N. 15½ miles from cape Northumberland. The coast between it and Green point is a sandy beach with low sand-hills behind. There is a sandy bar at the mouth, which is fordable at low water when the sea is smooth.

Mount Ruskin, 150 feet high, N.W. by W. 1½ miles from Glenelg river mouth, is situated on the boundary line between the colonies of South Australia and Victoria.

The COAST.—Eastward of Glenelg river the coast in the bight is a succession of hummocks about 150 feet high, partly covered with bushes, the sand in many places reaching the summits. At 2 or 3 miles inland there are densely timbered tracts of rising ground about 300 feet high.

A heavy swell constantly rolls on this part of the coast, rendering a wide berth necessary.

At a distance of about 12 miles to the north-west of cape Bridgewater a range of hills 500 feet high, and heavily timbered, lies at the back of the coast hummocks, at about 2 miles from the shore. At the west extremity of this range, between it and the shore, is a group of high bare sand-hummocks, and a large tract of bare sand is situated at a distance of 4 to 7 miles from the cape.

Mount Kincaid, 692 feet high, lies N. by W. ½ W. 12½ miles from cape Bridgewater geodetic station, and about 4 miles from the shore. It is scarcely visible from seaward, its appearance being that of a few trees only slightly elevated above the surrounding country.

Mount Richmond, 711 feet high, is conspicuous, and has a broad flat top. It lies from the geodetic station on cape Bridgewater N. ½ W. (nearly), 7½ miles.

CAPE BRIDGEWATER, E.S.E. 39 miles from cape Northumberland, has a flat summit 441 feet above the level of the sea, and falls gradually to the cliffy coast South and West of it, and to the cultivated land to the northward, the latter at its lowest part being elevated about 200 feet. The cape is visible 25 miles.

Anchorage.—Westward of cape Bridgewater there is slight shelter from easterly winds, but the bay is exposed to the prevailing winds. With discretion steam-vessels may use it, but a heavy swell will almost constantly be found rolling in the bay.

Bridgewater Bay.—Eastward of cape Bridgewater is a bight known as Bridgewater bay, but which, like the bay to the westward, cannot be recommended as an anchorage. A heavy swell rolls in during southerly and south-westerly breezes, and, except under favourable circumstances, vessels ride uneasily. The swell threatens to break in 20 fathoms, on a line between capes Bridgewater and Nelson, and does actually break at nearly a mile off shore. The current often sets outward along the shore of the cape.

In the bight between capes Bridgewater and Nelson, but nearer the latter, there is a large conspicuous body of drift sand, just East of which is mount Chaucer, a small peaked hill 405 feet high.

CAPE NELSON lies E. by S. 7 miles from cape Bridgewater, and is an irregular cape of jagged cliffs, 200 feet high, rising at the back and centre of the cape to lightly timbered and grassy hummocks, the highest of which is 459 feet high. Cape Nelson is bold of approach to the south-eastward. From cape Nelson the land trends northerly for nearly 3 miles, and thence East for 2 miles, where it suddenly turns S.E. to the promontory named cape Sir Wm. Grant; this piece of coast is composed of limestone cliffs from 100 to 200 feet in height.

LIGHT.—The lighthouse on the southern extremity of cape Nelson is of stone, and 79 feet high. The light is a *fixed* white light, visible between the bearings E. ½ S. through east, north, and west to W. ½ S., elevated 250 feet above the sea, and should be seen in clear weather 19 miles.

A *red* sector is shown to the eastward over Lawrence rock, between the bearings W. ½ S. and W.S.W.; and a *red* sector is also shown to the westward over the southernmost point of cape Bridgewater, and one mile seaward of that point, or between the bearings E. ½ S. and E. by S.

Cape Sir William Grant.—A well defined point, projecting one mile to seaward, lies N.E. by E. ½ E. 4 miles from cape Nelson, and has a table summit, the highest part of which is 222 feet high; the cape on all sides has precipitous cliffs, about 150 feet in height.

Danger Point lies N.E. ¼ E. from the last-mentioned cape, forming a bight between, outside of which, and at a distance of two-thirds of a mile South of the point, is a reef, with only 16 feet water, upon which the sea breaks heavily. A reef with 17 feet water, also extends from the point in an easterly direction half a mile from the shore.

Lawrence Rock, lying E. ¼ N. 2 miles from cape Sir Wm. Grant and S.E. by E. one mile from Danger point, consists of two small but conspicuous islets of limestone, the larger having two summits, the higher of which is 132 feet above the sea. The passage between Danger point and Lawrence rock is not safe for shipping.

With strong winds from seaward a current will be found setting out through this channel, sometimes with a force of 3 knots.

Aspect.—In clear weather, when off Portland bay, mount Napier, 1,400 feet high, is visible in the distance, and with mount Clay, 612 feet high, near the coast between Portland bay and port Fairy, will enable a stranger to identify the land in the vicinity. The appearance of mount Clay is that of a flat-topped hill with a notch in the centre; but for the notch it would closely resemble mount Richmond.

PORTLAND BAY* may be said to extend from Danger point N.E. ¾ N. 12 miles to Fitzroy river: and is the natural outlet of many millions of acres of agricultural and pastoral country. In the depth of the bay off the town of Portland there is good anchorage, sheltered from all but south-easterly gales, which seldom occur, and still more rarely with strength to do any damage to shipping.

The holding ground is good, being limestone ledges full of holes, generally filled with sand, but occasionally with blue clay and small boulders, apparently of volcanic origin. Coir rope springs are supplied by the Government for the use of shipping caught in south-easterly gales.

From Danger point the south-west shore of Portland bay trends N.N.W. ¾ W. one mile to Blacknose point, and thence in the same direction nearly 2 miles to the lighthouse on Battery hill near Observatory hill.

The shore about Danger and Blacknose points is low, being only from 60 to 70 feet in height. Blacknose point has a reef extending from it nearly a quarter of a mile, at which distance the depth is 3 fathoms.

From Observatory hill the shore trends W.N.W. nearly half a mile, to the entrance of Wattle Hill creek, which winds westward by the southern end of the town of Portland; from the entrance of the creek the shore curves along the front of the town N. by W. nearly a mile to Whaler point.

The shore from Observatory hill to Whaler point, or what may be termed Portland bay proper, is bordered by a sand-bank which has been heaped up by the swell; the edge of the sand-bank in 3 fathoms water is a quarter of a mile from the shore, the water then deepens more suddenly, and at 3½ cables or less, 5 fathoms will be found. The water then deepens gradually, until at a distance of nearly 2 miles there is 10 fathoms.

From Whaler point the land trends N. by W. for a quarter of a mile then N.W. nearly a mile, whence it turns suddenly to the northward, and at half a mile again suddenly to N.E. ½ E. At a distance of 5 miles is the mouth of Surrey river, about which is the village of Narrawong; this piece of coast from its turn to the north-eastward is low, being only from 6 to 12 feet above high water. At a short distance from the beach it rises, but the whole coast is so densely timbered as to make it uncertain where the elevation takes place. A sandy beach fringes the coast described and off it is Minerva reef.

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* *See* Admiralty plan of Portland bay, No. 2,504; scale, $m=2$ inches; and chart, Glenelg river to cape Otway, No. 1,062; scale, $m=0\cdot25$ of an inch.

At 2½ miles North of the mouth of Surrey river is mount Clay, 612 feet above the level of the sea. From the mouth of Surrey river the land trends with a slight curve in an easterly direction nearly 8 miles to the mouth of Fitzroy river.

The whole coast from Surrey river is a succession of sand-hummocks about 30 feet high, nearly destitute of vegetation, having perpendicular or cliffy faces.

Whaler Point or Look-out is a limestone cliff 107 feet high, off which a reef of rocks extends a quarter of a mile, with 7 feet water on its outer and shoalest part. There is no channel over this reef.

East of the point, on the tail of the reef, a chequered black and white buoy is moored in 3½ fathoms.

Minerva Reef extends almost the whole distance between Surrey river and Whaler point. Its shoal water of 9 feet does not lie more than half a mile from the shore, but 21 and 22 feet will be found at the distance of a mile ; the whole forms a large piece of uneven bottom on which the sea breaks at times heavily.

The Quarantine Ground is about two-thirds of a mile North of Blacknose point, where a yellow buoy is moored. There is no station.

PORTLAND, the capital of the county of Normanby, 225 miles West of Melbourne, was founded in 1834, and is the oldest settlement in Victoria. The chief exports are fish, wool, tallow, hides, bark, and recently wheat, and corn. The value of exports in 1880 amounted to 250,630*l.*

Near the centre of the bay a jetty runs out 1,000 feet into 17 feet water. A boat harbour is being constructed for small craft.

Portland is in direct communication with Melbourne by rail. There is also telegraphic communication between Portland and all the Australian colonies, as well as Tasmania. Steam-vessels frequently call during the week. The population in 1881 was 2,263.

SUPPLIES.—Fresh provisions and vegetables may be obtained, but not coal.*

LIGHTS.—On Battery hill near Observatory hill is a *fixed green* light, 116 feet above the sea and is exhibited from a grey stone lighthouse. The light should be visible 13 miles.

The light is visible between the bearings of N.W. through west, and S. by E. the latter bearing showing the inner line of anchorage in the bay, and clearing the shoal patch off Whaler Look-out. The light is white over the anchorage from S. by E. to the extremity of the jetty.

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* Lieutenant H. L. Ross, commanding H.M.S. *Raven*, November 1883.

A *red* light is exhibited from the new jetty near the centre of the bay. The light should be seen from a distance of about 3 miles.

A Life-boat is stationed at the jetty.

Anchorage.*—The best anchorage is in about 6 fathoms, half a mile from the shore, with Lawrence rock open of Blacknose point S.E. ½ S., and in a line with the new jetty, but vessels may anchor where most convenient, only preferring the southern shore. A red mooring buoy a little inside this position will be a guide to the anchorage. A vessel of heavy draught may anchor in 7 fathoms, at about a mile from the town, with Lawrence rock bearing S.E. ¾ S., and the jetty W. by S.; and there appears to be more convenient anchorage, in 6 and 7 fathoms, at half a mile farther to the north-westward.

DIRECTIONS.—A vessel bound to Portland bay from the westward should endeavour to sight the high land of cape Bridgewater, which, when seen from the distance of 12 or 15 miles from south-westward, appears covered with white sand-patches. She should then steer for the bay, keeping at a convenient distance outside Lawrence rock, and then hauling in to the north westward. As the vessel proceeds northward the houses of Portland will begin to open out from Observatory hill. Should the wind be scant, the vessel may pass to the northward of the town until it bears S.W., and then tack for the anchorage.

By Night.—Vessels entering Portland bay from the westward must not, when nearing Lawrence rock, bring the light to bear northward of N.W. by W. ½ W.; having passed the rock, a course may be steered towards the light, keeping it on the port bow, and not standing into less than 6 fathoms. When abreast the anchorage, the jetty light (red) will be seen bearing about West.

From the Eastward.—In proceeding to Portland bay from the eastward, a vessel should try to sight Lady Julia Percy isle, which lies E. ½ N. 17 miles from cape Sir William Grant, and may be passed within half a mile. From hence, in clear weather, mount Clay, on the northern shore, and cape Nelson to the westward may be seen.

Caution.—Between Lady Julia Percy isle and the mainland is a passage 3 miles wide; but it is not advisable for a large vessel to go through it, as a heavy swell from the south-west generally rolls in upon the coast, and frequent calms in summer make it unsafe; the whole coast being fronted by a border of dangerous rocks, extending for three-quarters of a mile off shore, with a breaking sea even further off. Steam vessels and other trading vessels using this passage are therefore cautioned against approaching the shore in this vicinity.

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* The Government of Victoria have in anticipation the formation of a breakwater at Portland.

At Night.—If a vessel has made out the land before dark, she may safely stand into Portland bay by attending to the chart and lead, and keeping the lights of the town—which will be visible at the distance of 5 or 6 miles—between the bearings of S.W. and W.N.W., which will give ample room, with smooth water, for working till daylight, or until the vessel is boarded. A boat will always be in readiness to afford assistance when required.

TIDES.—The tide in Portland bay, as regards its rise and fall, is entirely dependent on the winds. It is high water, full and change, at 0.30 p.m.; springs rise about 3 feet.

The COAST.—From Fitzroy river, which is 12 miles to the north-east of Portland, the coast trends with a curve E. by S. ¾ S. 10 miles to the entrance of lake Yambuk, in a south-easterly direction from which is Mills reef.

From lake Yambuk, Boulder point bears S.E. by E. ¾ E. 5¾ miles. The coast for the first half of the distance is sandy, having bare sand and grassy hummocks immediately over it; the highest, mount Hummock, 213 feet high, forms one of the points in the triangulation of the colony. The remaining half of the distance is of a rocky character.

From Boulder point to the south point of Griffith island (port Fairy), 4¾ miles, the general direction of the coast is E. ¼ N. The coast is strewn with boulders of various sizes, some uncovered at high water. A few sunken rocks lie at about a quarter of a mile from the shore.

Mills Reef lies a mile eastward of the entrance to lake Yambuk, and three-quarters of a mile from the shore, abreast of Lady Julia Percy island; it consists of several rocks awash at high water, and marked by kelp. *See* caution.

LADY JULIA PERCY ISLAND, lying E. ¾ N. 21 miles from cape Nelson, is of a triangular form, 155 feet high, flat-topped, and cliffy on all sides. From all points the island presents the same appearance, with the exception that the southern extremity is a few feet higher than the other parts, towards which the island has a small decline. There is indifferent landing on the north side in a small bay. Rabbits have been placed upon the island, and are numerous.

PORT FAIRY.—For 7 miles on either side of port Fairy the coast is low, that to the westward having grassy slopes with a few scattered trees, whilst that to the eastward is composed for the most part of bare sand-hummocks about 60 feet in height. In making this port from the southward the most remarkable land seen will be Tower hill, lying 7 miles

N.E. ¼ N. from Griffith island, which extends from the land in a north-easterly direction, and forms port Fairy.*

Tower Hill, 300 feet high, presents the appearance of a table-land, but that part more particularly named Tower hill is a peak thrown up by volcanic agency in the centre of a fresh-water lake; upon it has been erected a surveying station. From the westward, Tower hill itself is not visible, except in very clear weather, as it then appears in line with the higher table-land which lies one mile to the eastward. When Tower hill begins to bear northerly it opens out west of the table-land, and continues to be visible as a single conical peak. The table-land falls to the westward, and appears to join Tower hill; eastward it falls to the same elevation as the western land. The land in the vicinity, both East and West, is higher than the general coast line.

This hill is not only a good mark for port Fairy, but also for the adjoining port of Warrnambool, it being situated midway between the two places. After making Tower hill, Griffith island will be the next conspicuous land visible.

Griffith Island, a conspicuous point on this part of the coast, has two or three hummocks, the highest of which is 74 feet above high water; it is three-quarters of a mile long and half a mile broad, tapering away to the north-east point, where it is only 15 feet above high water; in it is included what was formerly Rabbit island; these two islands were united to seaward by artificial means, since which the sand has heaped up inside.

From the south extreme of Griffith island, which is composed of large volcanic boulders, the same description of shore extend to the eastward a quarter of a mile, terminating in a hillock 10 feet high, known as Dusty Miller island, there being a channel at high water between it and Griffith island.

Sunken rocks extend 200 yards from the southern shore of Griffith and Dusty Miller islands, and continue to 200 yards off the eastern point of Griffith island, upon which the lighthouse stands.

LIGHTS.—A red circular stone lighthouse stands on the eastern part of Griffith island. It is built nearly at high-water mark, and from it is exhibited a *fixed red* light, varied by a *flash* every *three minutes;* the light is 41 feet high, and visible from a distance of 9 miles. Within 3 miles it appears as a *fixed* light.

The light will appear as a fixed light for one minute and 40 seconds, be suddenly eclipsed for 34 seconds, then exhibit a bright flash for 12 seconds, and be again eclipsed for 34 seconds, when the fixed light will re-appear.

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* *See* Admiralty plan of port Fairy, No. 2,506; scale, m = 6 inches.

A white light is exhibited from one of the lower windows in the tower, and shows over the anchorage.

A light is exhibited from the extremity of the southern dike forming the entrance to Moyne river:—The light is a *fixed* light, and is cut to show *red* to clear the black buoy off the river entrance, round westerly over the foul ground to Griffith island; and *white* from the black buoy, round easterly over the river entrance. It should be visible in clear weather from a distance of about 3 miles.

From Look-out-hill near the jetty end a *fixed green* light is exhibited, which should be seen from a distance of 3 miles, between the bearings of South and W.S.W.

Buoy.—From the lighthouse on the east point of Griffith island to the east and north-east a reef, dry at low water, extends a cable off. Also from the same point in a N. by W. direction, rocky ground extends more than 600 yards with 7 and 10 feet near the northern extreme, and in no place, exceeding 15 feet. At this extreme a black buoy is moored in 17 feet, with the Custom-house just open of the end of the jetty, bearing W. by S. ¾ S., and the lighthouse S. by E.

Back Pass, a narrow channel between Griffith island and the mainland, has a bar of 6 feet, outside which the depth rapidly increases to 10 fathoms. This passage has been used occasionally by boats, but is not safe except in very calm weather.

With south-westerly breezes a strong current sets along the coast to the eastward, which has led the Government to remove some of the obstructions from the channel, which leading into the river Moyne is intended to scour the sand from the river's mouth, and so permit ships to enter the river and use the wharves at the town.

The stone removed from the Back pass has been formed into walls, which are being extended from the Moyne river entrance into the bay in an E.N.E. direction.

The coast to the westward of Back pass is bordered by sunken rocks, which extend from 200 to 400 yards from the shore. The shore itself is formed principally of large volcanic boulders.

Moyne River flows into port Fairy, and on a hill on the eastern bank, 38 feet high, and close to the river's mouth, stands a flagstaff. When the survey was being made there was a bar at the mouth of the river with only 2 feet on it at low water. By excavating the channel and running out two training piers into the bay, a depth of 7½ feet has been secured on the bar at low water.

Belfast.—At the mouth of Moyne river, W.S.W. of Melbourne, to and from which steam vessels ply at frequent intervals. There is daily communication by coach with Colac railway station. Vessels drawing 10 feet water can be loaded and discharged at the wharf stores in the middle of the town. It is the principal shipping port of the western district, a large trade in wool, grain, and general produce being done. In 1881 the exports were valued at 350,000*l.* The population in 1881 was 2,500 persons.

There is telegraphic communication between Belfast and all the Australian colonies, as well as Tasmania.

Jetty.—At 1½ cables to the northward of Moyne river entrance is a jetty extending 400 yards into 7 feet water; but it can seldom be used except as a landing place. At one and 2 cables North of the jetty, and 1½ cables from the shore, are two patches of sunken rocks, but being in shoal water they do not interfere with shipping.

A Life-boat is stationed at the jetty.

Reef point.—From the Moyne river entrance the shore of port Fairy trends N.N.W., and thence curves gradually round to N.N.E. and E. by N. to Reef point, which is N.E. by N. 2¼ miles from the lighthouse. All this piece of coast has a sandy beach with grassy sand-hummocks until within a mile of Reef point, when the hummocks are all of bare sand 50 to 65 feet in height.

Off Reef point volcanic boulders from 9 to 2 feet in height extend a distance of 400 yards, and sunken rocks extend 100 yards further.

DIRECTIONS.—After making out the hill on Griffith island, steer so as to clear the reef which extends from the lighthouse, then haul up for the anchorage, for which the flagstaff in line with the jetty is a good mark, or make fast to the moorings.

By Night, vessels entering port Fairy should not steer in until the *green* light on Look-out-hill is opened out, when steer for it and anchor as convenient.

TIDES.—It is high water, full and change, at port Fairy, at 0h. 31m.; ordinary springs rise 3 feet.

Anchorage.—The best anchorage for small vessels is in about 3 fathoms water, a cable north-west of the black buoy of the foul ground, with Griffith island lighthouse bearing S.S.E. The anchorage for large ships is in 5 to 6 fathoms off the tail of the reef, extending from the north-east point of Griffith island with the lighthouse bearing S. ¾ W., and the flagstaff in line with, or a little open northward of the end of the jetty S.W. ¾ W.

Vessels trading to port Fairy generally pick up an anchorage in about 15 feet water between the black buoy and the jetty; vessels making use of the port only during the continuance of a south-westerly gale may get as close in as their draught of water will permit.

The anchorage is bad with easterly winds, and no vessels are recommended to try and ride out a south-easterly gale, except as a matter of necessity, and then all precautions should be taken and springs placed on the cable. Here, as at Portland and Warrnambool, coir hawsers are in charge of the harbour-master.

Moorings.—There are two sets of moorings in port Fairy. From the outer set the flagstaff bears S.W. ½ W., and the lighthouse S. ¼ W.; it is laid down in 5 fathoms, and consists of a 25½ cwt. anchor, with 90 fathoms of 1⅝ inch chain.

The other consists of a 20 cwt. anchor with 90 fathoms 1⅝ inch chain in 25 feet water, bearing W. by S. a cable from the outer mooring. To each set of moorings a red buoy is attached.

Sisters Point is conspicuous from its having immediately over it two hummocks 65 feet high, so like each other as to have obtained the name of Sisters. Boulders 4 feet above high water lie a quarter of a mile to seaward of this point.

The COAST.—From Reef point, Sisters point bears E. by N. ½ N., 1½ miles. A point lies midway between forming a sandy bight on either side, but the whole distance between them from a quarter to half a mile from the shore is filled with high-water, half-tide, and sunken rocks. The coast between Reef and Sisters points is a succession of bare sand-hummocks about 50 feet high.

From Armstrong bay the coast is a sandy bight with grassy hummocks over it, varying from 100 to 160 feet height, trending to the E.S.E. for about 6 miles to Middle island, at the western part of Lady bay. Between one and 2 miles from Middle island is a tract of bare sand.

Armstrong Bay.—One mile E. by N. of Sisters point is a small sandy point fringed with boulders, forming a small bay known by the name of Armstrong. Sunken rocks are numerous, and nearly fill it up. This bay is used by fishing boats.

Helen Rock, of one fathom, lies E. ¼ S. 2¼ miles from Sisters point, and S. by E. ¼ E. from Tower hill. The rock is one mile from the shore, has 8 or 10 fathoms close to on all sides, and is of so pinnacle a form that a lead would not rest npon its summit. It rarely breaks, and is much in the way of coasters.

Mount Warrnambool.—In clear weather, and if the vessel be more than 5 miles from the shore, mount Warrnambool will be visible; it has a round but not very even summit 707 feet above the level of the sea. It lies from Warrnambool lighthouse N.E. by E. ¼ E. 13 miles, and from Flaxman hill N. ¾ W. 14 miles. A low spur of the same hill lies about 3 miles to the westward.

LADY BAY* is an indentation of the mainland extending from Middle island, its western point E. by N., 1¾ miles to Hopkins river, from which Hopkins reef, which is awash at high water, projects one-third of a mile to the southward. From Pickering point the land trends W. by N. ½ N. for about three-quarters of a mile, this piece of coast being composed of sandstone cliffs, the shore having numerous indentations with half tide and sunken rocks lying off it, in some places to a distance of 3 cables. Immediately over the cliffy shore are numerous sand-hummocks, in some cases grassed, but generally bare; the westernmost and highest of these is 115 feet high, the others vary from 60 to 80 feet. Behind Lady bay it is high and well wooded, while the land to the eastward of Hopkins river is clear of timber and grassy, rising gradually from the shore eastward of the river, and terminating in a high grassy down, at 1½ miles from the coast.

Warrnambool Harbour, on the western side of Lady bay, is formed by several outlying islands and rocks, nearly connected with each other, which extend from Pickering point in a S.E. and E.S.E. direction. The largest of these is what is named Middle island, on the summit of which the old lighthouse stands. Between Middle island and Pickering point is Merri island, and outside to the eastward is Breakwater rock, 18 feet above high water, and encircled by sandstone ledges, which uncover at half tide. Other rocks uncovering at half tide, and awash at low water, lie to the south-eastward. The extreme of these rocks bears from Pickering point S.E. by E. distant a little more than half a mile.

Merri Island, lying 100 yards S.S.E. from Pickering point, to which it is all but attached by half-tide rocks, is 47 feet high, and very small, not being 200 yards in extent.

Middle Island, the central and largest of the three islets which form Warrnambool harbour, is 250 yards long N.W. and S.E., and 100 yards broad; it lies S.E. of Merri island, to which it is almost joined by rocks of various heights. On one of these, Datum rock, a datum mark for tides has been placed, on which is written "The bottom of this is 5 feet 6 inches above ordinary low water."

From Middle island in a southerly direction, for a distance of a cable extend several half-tide rocks, and at a further distance of 4 cables in a S.S.E. direction is a dangerous rocky patch of 17 feet, upon which the sea breaks heavily, the intervening space between it and the island being uneven and rocky.

Breakwater Rock, a small islet 18 feet high, lies a cable East of the old lighthouse on Middle island. Between it and Middle island is a small rocky passage with from 2 to 12 feet water. Fronting Breakwater rock to the south and south-east are several half-tide ledges nearly joined to one another, and distant from Breakwater rock nearly a cable. Off these again to the south-east at a further distance of a cable is another half-tide ledge, with two small patches, each a foot above high water. Rocks awash at low water extend a cable from the last-mentioned ledge.

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* *See* Admiralty plan of Lady bay, No. 2,494; scale, m = 8·5 inches.

WARRNAMBOOL, the main part of the town is situated about half a mile from the shores of Lady bay, 170 miles to the south-west of Melbourne. A jetty nearly 800 feet long, with a tramway to the stores. gives facilities for loading and discharging vessels; cargo is transhipped into lighters in Lady bay.* The principal exports are wool, potatoes, wheat, preserved meats, and dairy produce; the value for the year ending 30 June 1882 was 397,978*l*. Steam vessels ply frequently to Melbourne. There is also coach communication to Camperdown railway station. The population, in 1881, was 4,837 persons.

There is telegraphic communication between Warrnambool and all the Australian colonies, as well as Tasmania.

Merri River.—Immediately behind Pickering point is the mouth of the Merri river, which ordinarily may be stepped across, but floods wash the sand from its mouth, and cause the discharge of a large body of water. Formerly the Merri river curved along the shore at the back of the sand-hummocks, but it was feared that as the sand was blown inland the river might be the means of conveying a large quantity into the harbour and so help to fill it up; in consequence of which a chain of lagoons was joined and united with the river above the sand encroachment.

From Merri point, the north entrance point of the Merri river, the land trends in a northerly direction for about one-third of a mile, whence it trends in an easterly direction for about half a mile, and then south-east to the mouth of the Hopkins river, the heads of which form the east side of Warrnambool harbour.

The Bar.—Warrnambool harbour is protected to the south-eastward by a bar of 3½ to 5 fathoms water, which adjoins and extends from a rocky patch awash at high water, lying South 3 cables from Hopkins river heads.

The 5-fathoms extreme of this bar is only 3 cables from the low-water rocks, extending S.E. from the islands off Pickering point, and this distance forms the main or south channel into Warrnambool harbour.

Between the bar, and about a quarter of a mile from the shore, the soundings vary from 7 to 4 fathoms, the bottom being generally sand over rock or sandstone rock.

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* To provide better shelter, it is proposed to erect a breakwater to run northward from Breakwater rocks.

Moorings.—There are two sets of moorings in Warrnambool harbour, one in 3½ fathoms, consisting of a 37 cwt. anchor with 90 fathoms of 1¾ inch chain, the other in 13 feet, consisting of a 26 cwt. anchor with 75 fathoms of 1⅝ inch chain; to the end of each chain a red mooring buoy is attached.

Lifeboat.—At the jetty is a lifeboat station.

LIGHTS.—Two leading lights are established on the sites of the obelisks, on the hill ridges immediately in front of the town.

The upper, a *fixed white* light, is exhibited from a tower, at an elevation of 109 feet above the sea, and is visible from East round by north to N.W., from a distance of 14 miles. The lower light is a *fixed red* light, shown from the top of the lower obelisk at 87 feet above the sea, and can be seen between the bearings of N. ⅛ E. and N.W. from a distance of 5 miles.

A *fixed green* light is exhibited from the extremity of the jetty.

DIRECTIONS.—The leading marks into Warrnambool harbour are the two light towers 140 yards apart, erected on the northern shore, the summits being respectively 109 and 87 feet above high water.

The South channel, which is the best entrance into Warrnambool harbour, has in its centre two rocky patches of 27 and 29 feet, over which the above leading marks when in line North lead. The bottom of the whole channel is rocky and uneven, varying from 9 fathoms to 28 feet, but in which a depth of 6 fathoms might be maintained.

A stranger bound to Warrnambool harbour from the westward or southward will be greatly guided as to his relative position by Tower hill, which is only 3 miles from the coast, and 7 miles West of Warrnambool.

Taking care to avoid the 17-feet patch which lies S.S.E. nearly half a mile from Middle island, vessels are advised to bring the upper light tower its breadth open west of the lower one N. ¼ E., and steer into the harbour on this line. Sailing vessels especially, cannot do better than hug the break off the rocks, as by getting under their lee they are enabled, without danger of shipping a heavy sea, to haul up for the anchorage.

Vessels are recommended not to approach too near the mouth of Hopkins river. In bad weather, or with a heavy southerly swell, the sea breaks a mile off the land. In fine weather, however, vessels may, and do cross in all directions, the bar extending from Hopkins river.

From the eastward Tower hill is the best guide to the locality. Warrnambool hill is hidden by the land if within 4 miles, and being upwards of 10 miles inland is often obscured by mist.

After approaching near enough to make out Warrnambool, either cross the bar to the south-eastward, or should it be discovered that the sea is breaking on the bar across the south-east entrance of the bay, haul off and stand to the westward until the coast in that direction be opened clear of the islands, then proceed to get the leading marks as before directed. Crossing the bar must depend entirely on the weather. The great disadvantage of crossing it is that vessels will have to proceed broadside to the swell.

Warrnambool is the only one of the three western ports of Victoria which may be considered safe in south-easterly gales. This is in consequence of the outer swell being broken on the bar fronting the harbour to the south-eastward. Coir rope springs are supplied by the Government and should be placed on the cable in the event of a heavy swell setting in to the anchorage.

By Night.—Vessels entering Warrnambool harbour from the westward or southward, should first sight the *red* light (carefully avoiding the 17 feet patch which lies S.S.E. half a mile from Middle island), and then bringing it in line with the white light, bearing North, steer in between the 5 fathoms bank and the foul ground south east of Breakwater rock until the *green* light on the jetty is opened, when steer in for it and anchor. From the eastward, either bring the marks above described on or cross the bar to the south-eastward, taking care not to shut the white light in when standing towards the mouth of Hopkins river.

Caution.—It is not safe to enter or leave the harbour in south-westerly or southerly gales.

Remarks.—On the approach of a heavy south-west gale with night coming on, Portland bay is easy of access, and affords good shelter until the gale abates. This is considered of great importance, as it would be dangerous to take Lady bay in a gale from S.W. or South, as the sea breaks with great violence across the south-east entrance.

Anchorage.—Warrnambool harbour is small and not adapted for large vessels, the outer anchorage being in 3½ to 4 fathoms, with a swell sometimes which causes a diminution of the depth. The best anchorage is in about 15 feet water, about a cable from the ledge off Breakwater rock.

In order to prevent vessels going too near the site where blocks have been deposited for the breakwater, a black buoy has been placed in 3½ fathoms, about 2½ cables to the S.E. of the green light on the jetty.

Vessels having entered the harbour must pick up an anchorage where most convenient, according to their draught of water, only endeavouring to anchor as close as possible to Breakwater rock; or they may make fast to the moorings.

All vessels using this port should be provided with good springs for their cables as even in the finest weather there is a heavy range.

TIDES.—It is high water full and change in Warrnambool harbour at 0h. 37m.; springs rise about 3 feet.

The COAST.—From 4 miles East of Warrnambool to Moonlight head, which is 38 miles farther to the south-east, the coast is of a cliffy character, and presents an almost unbroken appearance, the only break to its uniformity being a broad-topped cultivated hill 220 feet high, over the east bank of Hopkins river, and a fall in the land 9 miles East of Warrnambool. The cliffs are higher as Moonlight head is approached.

The coast from Hopkins river, at the eastern part of Lady bay, to Flaxman hill is nearly straight, and apparently bold, but a heavy swell constantly rolls in and breaks in about 5 fathoms water; the coast thence continues to trend in the same direction, and is of the same character, for a further distance of about 3 miles, and is then locally known as the Bold projection. Sunken rocks will here be found at a distance of a quarter of a mile from the shore. The Bold projection is the only projecting part of the coast between Moonlight head and Warrnambool, but otherwise is no more conspicuous than other parts of the coast in the neighboorhood.

Flaxman Hill, 262 feet high, bears S.E. by E. ½ E. 14 miles from the mouth of Hopkins river; at a quarter of a mile N.W. of Flaxman hill is a second hill not quite so high, but sometimes more conspicuous, in consequence of its sandy appearance. The two hills together are a good guide to the locality of a part of the coast, which otherwise presents a great sameness of appearance, overhanging cliffs forming the principal feature. About midway between Hopkins river and Flaxman hill the coast range immediately over the cliffs is rather higher than the adjacent land, being there elevated 242 feet above the level of the sea. A large pile of stones has been built upon the summit of Flaxman hill.

Bay of Islands.—The western land of the Bay of Islands lies close to the S.E. of the Bold projection and S.E. by E. ½ E. 18 miles from Warrnambool. The bay may be identified by its white cliffy appearance, varied by numerous small islands all of the same character, the whole presenting a pleasing and striking appearance to the eye.

From the western part of the Bay of Islands to Curdie inlet, distant 4 miles E.S.E., the coast is cut by bays and studded by small islands. The sea breaks heavily half a mile from the shore, and it is probable that sunken rocks fringe the whole distance. It was not safe to sound this piece of the coast, and therefore it should be carefully avoided.

Curdie Inlet is conspicuous from the sandy nature of the entrance, and is often barred across. The mouth is low and interspersed with low water rocks. At the west point of the inlet, on the highest part of the coast, there is a conspicuous sand-patch, and eastward there are other sand-hills or patches; these are more conspicuous from their contrast with the cliffy coast on either side.

From the immediate mouth where the fresh water discharges itself there is a widening of the entrance to a second or outer mouth, and at the points which form the outer mouth, are several limestone rocks, those about the western point being more numerous; those off the eastern point are about one-third of a mile from it, and are joined to it by a narrow neck of sand the central portion of which is washed over by the sea; the highest of the eastern rocks is about 17 feet in height, and a ledge extends from it in a N.W. and S.E. direction. The sea breaks violently to the East and South, and across the mouth from the ledge to the rocks off the western point there is also a heavy break.

From Curdie inlet, Hesse point bears E. by S. 3 miles; the coast between is irregular and cliffy. At Curdie inlet the appearance of the coast begins to change in consequence of the cliffs being backed by higher ground. From Hesse point the coast trends E. by N. 2 miles to the mouth of port Campbell.

Port Campbell is the only anchorage between Warrnambool and cape Otway; but the anchorage is directly open to the S.W. The entrance to port Campbell is marked by headlands, the eastern head is from 60 to 80 feet high, and the western 200 feet high, and bears from the former W.S.W. A reef off the eastern head reaches in a south-westerly direction to nearly three-quarters of a mile and breaks heavily; whilst the reef off the western head extends in the same direction only a little more than a quarter of a mile, and on which there is very little break. The channel between these reefs is from 250 to 300 feet wide. The western side of the port is formed by almost perpendicular cliffs 200 feet high, running out from the beach to the south-west. The eastern side is also formed by cliffs, but not as high or projecting as far from the beach. At the western end of the beach Campbell creek empties itself into the sea. There are about 12 acres of anchorage ground, with soundings from one to 3 fathoms, gradually increasing to 4 fathoms when abreast of the eastern head and to 5 and 6 fathoms to a point in line with the western head. The bottom is sandy with patches of limestone rock. In heavy weather there is a great drawback off the beach, which causes vessels to surge considerably at their anchors, necessitating a spring being run out to the shore. It is reported that during the summer months from December to March inclusive, there is smooth water at the anchorage. The port may be considered an anchorage for small craft of 30 to 40 tons, and for steam vessels of the Murray river class, drawing from 6 to 8 feet water.

After northerly winds there is good landing, and when the district becomes more populated, the projected jetty is built, and telegraphic communication is established, there will be no difficulty in utilising the place in favourable weather.

The COAST.—From port Campbell the coast trends E. by S. ½ S. 3 miles to the Sherbrook river, and thence with a slight curve S.E. by E. 11 miles to Moonlight head. Midway between the latter two places is Ronald point. At one and 2 miles East of the Sherbrook river are a few islets and rocks known as the Sow and Pigs. At a distance of one to 3 miles West of Moonlight head there are several ledges which cover and uncover and are skirted by a few sunken rocks, at a quarter of a mile from the shore.

Moorings.—There are moorings, viz., two 15 cwt. anchors, with 15 fathoms of 1¼ inch chain on each anchor, shackled together to a ring through which is rove 15 fathoms of ⅞-inch chain to the mooring buoy. Vessels using these moorings must have a spring out astern to the beach.

DIRECTIONS.—Upon approaching port Campbell from either side the sea will appear to break right across the entrance, but, when the sandy beach becomes well open, a passage will be seen between the breakers, and can with confidence be taken in moderate weather on the Fairway marks. The eastern break is very defined, as it is one continuous break from its outer extreme to the shore, with bold water immediately clear of the break on its west side. The left extreme of the East head in line with beacon on hummocks N.E. ¼ N. leads between the east and west breaks, until the two poles on Napier bluff are in line N. by E. ¼ E., which line keep until the beacon on hummocks shows a little to the westward of mooring buoy, then steer straight for the moorings.

TIDES are influenced greatly by the wind. The set is principally south-easterly, or outward across the east break. Mean rise about 4 feet.

Ronald Point, lying midway between Sherbrook river and Moonlight head, is a bluff point 257 feet high, conspicuous by a large body of drift sand to the eastward; the point forms the west head of the Gellibrand river. This river, though draining a rather large tract of country, is similar to Curdie inlet, Campbell creek, and Sherbrook river, having a small mouth never very broad and barred across in dry seasons.

MOONLIGHT HEAD is bold, rounded and densely timbered not only over the cliffs but wherever it is possible for vegetation to cling; the undergrowth is almost impenetrable. The hills immediately over the coast are about 500 feet high, the highest being 546 feet; these hills form spurs of the Otway ranges, which rise gradually at the back, until at 2 and 3 miles from the shore they attain an elevation of over 1,000 feet.

The highest hill of the Otway ranges West of cape Otway is 1,800 feet high, and has a rounded summit; it lies N.E. 10½ miles from Moonlight head.

Several rocks above water closely skirt the shore of Moonlight head.

The COAST from Moonlight head trends to the N.E. and East, and forms a bight to Lion headland, which is 3 miles distant.

North-eastward of Moonlight head, distant one-third of a mile, is Reginald point, with a small islet close to.

Lion Headland is formed of bold high cliffs, perhaps the highest on the coast of Victoria; here too the Otway ranges have the greatest elevation when near the coast.

Rotten Point lies E. by S. ½ S. 4 miles from Lion headland. Between the two points a bight is formed, in the depth of which, at 3 miles from the latter place, is Joanna river, with a sand island at its mouth. Rotten point is rocky, and has a rock awash at high water lying a quarter of a mile to the southward. Cape Otway bears from the rock S.E. by E. 7 miles distant; nearly midway between them is the mouth of Ayr river. There are several conspicuous sand-patches about the mouth of Joanna river and Rotten point, and there is one very large body of drift sand just to the eastward of Ayr river.

The coast between Rotten point and cape Otway is rocky, and the sea generally breaks in 5 fathoms of water.

A conspicuous conical peak 1,650 feet high, with a range of about the same elevation near it to the northward, lies N. by E. 10 miles from cape Otway lighthouse.

CAPE OTWAY, the northern point of the western entrance of Bass strait, is a bluff cliffy projection 250 feet high, of a dark brown colour, with patches of coarse sandstone rising to openly timbered grassy hummocks, not exceeding 350 feet in height. A rocky ledge, with 10 feet water on its shoalest part, lies S.S.E. three-quarters of a mile from the cape; and a very heavy ripple extends nearly 2 miles from the shore, with the lighthouse bearing N. by E. to N.N.W. This ripple had, until sounded, been looked upon as a dangerous reef, a vessel having had a boat washed away when passing near it.

Do not approach the cape within a mile on a N.W. to N.N.E. direction and to the westward not nearer than 2 miles.

LIGHT.—A white circular lighthouse 62 feet high, and 300 feet above high-water level, stands on the south-western extreme of cape Otway, from which is exhibited a *revolving* light once *every minute*, and in clear weather it is visible at the distance of 24 miles.

NOTE the distinctive features between this and cape Schanck light.

Danger Light.—A *red* danger light is exhibited from cape Otway lighthouse, 48 feet below the revolving light.

The red light is so screened as to be obscured when approaching from seaward, until 4 miles distant, on a N. by W. bearing; and will be visible (in clear weather) to a vessel proceeding on a W. by S. or E. by N. course, until run out of sight at 8 miles distant.

Note.—This red light is exhibited to warn Mariners of approaching danger, and when seen, a vessel should alter course to run it out of sight. In thick or foggy weather Mariners should not rely on sighting the red light, but should keep a good offing.

Telegraph Station.—On cape Otway there are also a telegraph station and flag-staff; the former is in connection with the capitals of Victoria, South Australia, and Tasmania, by means of which communication with passing vessels can be obtained.

Soundings.—The 50-fathoms line of soundings, distant 3 miles South of cape Nelson, increases its distance from the shore rapidly until South of Lady Julia Percy island, where it is distant 23 miles from the shore. South of Moonlight head, it is distant 30 miles; it then takes a gradual sweep in towards the mouth of Bass strait, and at cape Otway is distant only 8 miles.

In-shore of the 50-fathoms line the soundings shoal very gradually.

The 100-fathoms line of soundings is found at about 15 miles distant from cape Northumberland, 17 miles from capes Bridgewater and Nelson, and thence it increases its distance from the shore until S.W. of Moonlight head it is 40 miles off. It is about 50 miles from a line joining capes Otway and Wickham, and 30 miles from the west coast of King island. At the depth of 100 fathoms the bank of soundings appears to drop very suddenly. Seaward of this depth no bottom was obtained at 165 fathoms and 175 fathoms.

TIDES.—It is high water, full and change, at all places on this coast at nearly the same time, namely, Portland bay, 0 h. 30 m.; port Fairy, 0 h. 31 m.; Warrnambool, 0 h. 37 m.; New Year islands (King island), 0 h. 48 m.; Surprise bay (south part of King island), 0 h. 43 m.; Sea Elephant bay, (King island), 0 h. 50 m.

The tides are much affected by the winds. A south-westerly or westerly breeze keeps up the flood tidal stream, and increases its force; an easterly breeze has an opposite effect. While tides were being observed in Surprise bay, an easterly gale had the effect of doing away entirely with one flood tide.

In October, November, and December, when south-westerly breezes mostly prevail, a current may be expected to run to the eastward. In January, February, and March, a westerly current may be expected, but as these currents do not appear to be at any time continuous, they cannot with certainty be allowed for. They will be found stronger as the coast is approached, and strongest off the various headlands, such as capes Bridgewater and Nelson, Moonlight head, and most particularly near cape Wickham.

The Barometer will be found a valuable companion on this coast, as may be seen by reference to pages 633–635.

CHAPTER IV.

AUSTRALIA.—SOUTH COAST, WESTERN ENTRANCE OF BASS STRAIT; KING ISLAND, AND CAPE OTWAY TO PORT PHILLIP.

Variation in 1884.

King island - - 8° 0′ E. | Port Phillip - - 8° 5′ E.

Since the discovery of Bass strait by an enterprising gentleman of that name, the surgeon of H.M.S. *Reliance*, in an open whale-boat from port Jackson, in 1798, it has been much used by vessels navigating to and from that port, and is found a very safe and generally much shorter route than round southward of Tasmania.

BASS STRAIT,* which separates the South coast of Australia from Tasmania, is about 200 miles long, nearly East and West, and 120 miles wide. The western end between cape Otway and cape Grim, the north-west extreme of Tasmania, is 120 miles wide, but King island, which lies midway, occupies nearly 36 miles of this space, having the safest entrance, 47 miles wide, to the north-westward, and another entrance, 37 miles wide, to the south-eastward of the island; the latter entrance, however, being much impeded by numerous dangers, is only recommended to the general navigator in cases of emergency.

The eastern entrance of Bass strait is still more crowded with islands and rocks, more than 50 miles of the southern portion of the entrance being occupied by Flinders and Barren islands, the latter being separated from the north-east extremity of Tasmania by Banks strait.

As the northern portion of Bass strait contains the approach to port Phillip, and the most frequented route between the southern and eastern coasts of Australia, the navigator's attention will be first directed to this portion of the strait, together with the coast from cape Otway to Gabo isle, near cape Howe, including port Phillip; the southern portion, with the north coast of Tasmania, being subsequently described in chapters V. and VI.

KING ISLAND, of which the northern end forms the south-east side of the northern and safest entrance into Bass strait from the westward, is 36 miles long, North and South, and 13 miles broad at the centre.

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* *See* Admiralty charts of Bass strait, Nos. 1,695a, and b; scale, m = 0·20 of an inch; King island, No. 404; scale, m = 0·49 of an inch. Also General chart, Australia, Southern portion, Sheet 2, No. 2,759b.; scale, *d* = 1 inch.

Caution.—In approaching King island from the westward, especially during thick or hazy weather, caution will be required on account of the variable strength of the current, and the use of the lead is enjoined. Many fatal wrecks have occurred on this island, apparently from errors in reckoning. Commanders of iron ships, especially of those newly built, are therefore warned as to the necessity of ascertaining the errors of their compasses on approaching the Australian coast.

Soundings of 60 or 70 fathoms will be found at 25 to 30 miles westward of King island. Outside of this limit the soundings deepen rapidly to no bottom with 100 fathoms line. Inshore of 60 fathoms soundings the depths are irregular, but 30 fathoms will be found at a distance of 4 miles to the N.W. of cape Wickham. For further description see page 303.

The COAST.—From the point lying a mile S.W. of cape Wickham the coast is of the same nature for 2 miles as the shore of cape Wickham, and trends with a curve S. by W. ¾ W. 8 miles to Whistler point. At 2 miles distant from the first-mentioned point some sunken rocks extend to a distance of nearly three-quarters of a mile from the shore; and here a sandy beach commences and continues to within three-quarters of a mile of Whistler point. At the south-western extreme of the sandy beach there is good landing in nearly all weathers. A dilapidated hut, points out the landing-place. Three-quarters of a mile N. by E. from Whistler point is Elizabeth rock, dry at low water. Numerous other rocks above water, as well as sunken, lie off the point in all directions. At 2 miles N.E. of Whistler point a fresh water creek empties itself. At one mile S.E. by S. of the point the land rises to a height of 265 feet.

CAPE WICKHAM, the northern extremity of King island, is formed of gray granite, and bears S.E. by S., 48 miles from cape Otway. A few sunken rocks fringe its shore at the distance of a cable. North of the cape the unevenness of the bottom and the strong tides often cause a break at a much greater distance than the rocks extend.

LIGHT.—The lighthouse upon cape Wickham is a white circular tower 145 feet high, exhibiting at a height of 280 feet above the level of the sea a *fixed* white light of first order. It lies to the north-west of a round hill 300 feet high. The light will be visible in clear weather at a distance of 24 miles when bearing from N.N.E. round by east to W. by N. ¼ N., with the following exception, namely, that when within a radius of 19 miles, if on a N.E. ½ N. bearing, the light will be obscured by the highest part of North New Year island. A ray of light is visible on a W. by N. ¾ N. bearing over a dip in the land.

CAUTION.—The attention of mariners is called to the following extract from the report of the Lighthouse Commissioners appointed by the Colonial Governments:—" In advising the erection of a lighthouse on King

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LIGHT.—The lighthouse upon cape Wickham is a white circular tower 145 feet high, exhibiting at a height of 280 feet above the level of the sea a *fixed* white light of first order. It lies to the north-west of a [illegible] hill 300 feet high. The light will be visible in clear weather at a distance of 24 miles when bearing from N.N.E. round by east to W. by N. [illegible] with the following exception, namely, that when within a radius of [illegible] if on a N.E. ½ N. bearing, the light will be obscured by the high land [illegible] North New Year island. A ray of light is visible on a W. by [illegible] bearing over a dip in the land.

CAUTION.—The attention of mariners is called to the [illegible] extract from the report of the Lighthouse Commissioners appointed [illegible] Colonial Governments:—"In advising the erection of a lighthouse [illegible] island, the Commissioners wish to guard themselves from affording the public any reasonable supposition that this light can be at all considered in the position of a great highway light for the navigation of Bass strait. The south coast of Australia, at the western end of the strait, being free from danger, affords in their opinion the safest route for the prudent mariner to approach, and they conceive that the light on King island is only to be regarded as a beacon for warning navigators of danger, rather than as a leading light to a great thoroughfare."

Harbinger Rocks.—East Harbinger or N.E. rock lies N.W. by W. ½ W. 3¾ miles from cape Wickham lighthouse, and consists of a group of sunken rocks about 200 yards in extent. In heavy weather, or when there is a swell, this reef breaks much heavier than the West Harbinger; but there are times when it will only occasionally break.

The West Harbinger, lying W. by N. 4½ miles from cape Wickham lighthouse, has the appearance of a small flat-topped boulder about a foot above high water. A sunken rock, which does not always break, lies 1½ cables to the south-west.

The Harbingers are 1½ miles apart. There is deep water between them, and from 9 to 14 fathoms all round. Irregular depths, varying from 15 to 28 fathoms, will be found between the Harbinger rocks and the shore.

Navarin Reef[*] lies N.N.E. ½ E. 2¼ miles from cape Wickham lighthouse, and 1½ miles from the shore. The principal part is a rock awash at high water, N.E. of which, at the distance of a cable, is another rock occasionally dry. The body of the reef is nearly half a mile long, in an E.N.E. and W.S.W. direction. The sea generally breaks on this reef.

Victoria Cove.—At one mile from cape Wickham, in a south-westerly direction, is a second cape, which may almost be considered as a part of the former. Between the two capes, Victoria cove is formed; it has a small sandy beach, on which the sea breaks continuously and violently. This cove, being in the vicinity of the lighthouse, is used as a landing place for stores. The lighthouse keeper has a large surf boat, which lessens the danger of landing, but no ordinary boat should attempt to land without a thorough understanding with the keeper that it is safe.

The following signals are adopted:—

A ball at the south yard-arm of the flagstaff, in addition to the ensign at the head of the staff, and then lowered a little, signifies that a boat can land at the cove.

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[*] Captain Stokes observes, that the great depth of water in the immediate vicinity of these rocks gives no warning of their proximity in the night, or thick weather.

Ensign at south yard-arm. Vessels should anchor at New Year islands.

Ensign at north yard-arm. Vessel should anchor on the east side of King island.

Two fires on the point is a signal to a vessel waiting at New Year islands that there is safe landing at the cove.

Notwithstanding these signals as to safety of landing it would be wiser, not to risk valuable lives in ill-adapted boats, but to let this dangerous service be performed by those thoroughly acquainted with its nature, and supplied with proper appliances.

NEW YEAR ISLANDS and FRANKLIN ROAD.*—North New Year island lies S.W. ½ S. 7 miles from cape Wickham lighthouse, and is curved in form, about one mile long N.E. and S.W.; its highest part, near the southwest extreme, is 117 feet above high water. A channel one quarter of a mile broad, divides North from South New Year island. The latter island is three-quarters of a mile long, in a N.N.W. and S.S.E. direction, and less than 100 feet in height. Eastward of these islands is Franklin road, an anchorage for small craft protected from all weathers, known locally as New Year islands anchorage.

Between South New Year island and King island shore there is a distance of over a mile. Several rocks, some above water, others sunken, occupy at nearly equal distances the whole of this space, leaving, however, channels of deep water between. As the sea breaks upon the various dangers the channels may be used in a case of necessity, such as a vessel happening to get upon a lee shore.

The Anchorage in Franklin road is in 5 or 6 fathoms water, with the east point of North New Year island bearing N. by W., and a remarkable rock at north extreme of South New Year island, known as the Asses ears, bearing about S.W. The best guide for the anchorage is the absence of kelp. Kelp grows everywhere except in the tidal gutter setting between the islands; here only is the bottom comparatively free from rocks. The anchorage ground being small in extent it is necessary to moor, unless in a small craft, for which there would be room nearer the shore. An ordinary sized vessel must either moor or anchor further out, and in the latter case she would be exposed to the swell, which, more than the wind, has to be guarded against at this anchorage. Immediately a swell sets in, a spring should be placed on the cable, and care taken that the cable does not foul any sunken boulders, but this is not likely to happen if the ship is moored in the position recommended. A small rock, generally above water, but sometimes covered, occupies what would otherwise be the best anchorage.

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* *See* Admiralty plan of Anchorages in Bass strait, No. 1,694; scale, $m = 1$ inch.

Though the anchorage may be considered quite safe if the above precautions are taken, yet mariners are not advised to use it. Independently of the foul bottom, and the small extent of the anchorage ground, which will only accommodate one ordinary sized vessel, the tides often run too strong to enable a ship to pick up a berth as wished. A schooner was in this way forced to take up an outer berth, and was only saved from wreck by the steam vessel *Victoria* towing her into a place of safety.

The principal use of New Year islands anchorage is as a place of waiting for the vessel bringing stores or wishing to communicate with the lighthouse.

TIDES.—It is high water, full and change, at New Year islands at 0 h. 48 m.; springs rise 3 feet. The stream turns, in fine weather, at high or low water, but is greatly affected by prevailing winds.

Supplies.—Crayfish are numerous here, and occasionally other fish abound. The mutton-bird, the flesh of which is eaten, and the oil used for tanning purposes, has a breeding place on New Year islands, and arrives regularly every year from the 23rd to the 28th of November, to deposit its eggs.

There is a watering place in the south-east corner of North New Year island facing the anchorage.

Snakes are numerous.

The COAST.—Netherby point lies S. ¼ E. 12 miles from Whistler point. The intervening coast presents a very uniform appearance; the coast ranges are densely timbered, and about 300 feet in height. The coast is broken up into small bays, with off-lying rocks generally above high water, but sometimes sunken. The sunken rocks in some cases extend to a distance of three-quarters of a mile from the shore, and outside of these there is much foul ground, which, with tidal streams and a westerly swell, often make a breaking sea, leading anyone unacquainted with the coast to imagine rocks everywhere. At 1¼ miles South of Whistler point there is a small sand-patch; and at 7¼ miles from the former there is a very conspicuous long and bare sand-hill, at the foot of which there is a sandy beach.

At 3¾ miles W.S.W. from the sand-hill, and 8½ miles S. ¾ W. from Whistler point, is a patch of foul ground, which was often observed to break, but upon which when not breaking not less than 6 fathoms water could be found. N.W. ¾ W. 2 miles from Netherby point is a rock awash at low water, which breaks heavily.

From Netherby point the land trends to the southward and eastward for nearly 2 miles to Waterwitch point.

From Waterwitch point the coast trends south-easterly for 2 miles to a conspicuous long sand-hill similar to that to the northward; and thence the coast, of the same broken and rocky character, trends S. by E. 5½ miles to Fitzmaurice bay.

Waterwitch Reef.—At a distance of 2 miles South of Waterwitch point is Waterwitch reef.

This reef with the foul ground adjacent is nearly a mile in extent, but the centre is the only part which continuously breaks. Midway between Waterwitch reef and the shore is a rock which uncovers, and between it and Waterwitch point it is all foul ground.

Currie Harbour lies just to the southward of Netherby point, and affords shelter from all winds. It is only adapted for small craft, such as frequent the island for the skins of seals or kangaroos.

LIGHT on the south side of Currie harbour. The light is a *flashing* light, showing *five* flashes and eclipses alternately in a *minute*, elevated 150 feet above the sea, and should be visible in clear weather from a distance of 17 miles. The light illuminates, an arc of 180°, from New Year islands on the north, to Cataraque point on the south.

The lighthouse, 70 feet high, constructed of iron, with central tube for staircase, and supported on 6 iron columns, is situated on an eminence about 80 feet high.

Caution.—Mariners approaching King island are specially warned to note the distinctive features between Currie harbour flashing light and cape Otway revolving light, on the coast of Victoria, viz.:—Currie harbour light shows *five* flashes *every minute*. Cape Otway light attains its greatest brilliancy *once every minute*.

FITZMAURICE BAY affords good shelter in easterly winds in about 10 fathoms sand, off the sandy beach in the depth of the bay. A sand-patch is a good guide to the locality. As the wind always veers from East round northerly to N.W. and West, and as the westerly change is often very sudden, this bay can only be used with caution.

Water.—There is a good fresh water stream near the northern corner of the sandy beach, but a heavy surf will nearly always be found.

Cataraque Point forms the western point of Fitzmaurice bay. It lies from Netherby point S. by E. ½ E. 9 miles. At a cable N.W., there are a few sunken rocks, some of which are awash at low water. From Cataraque point the coast, which has an elevation of about 300 feet, and is here bold and cliffy, trends S.S.E. for 3½ miles to Surprise point, eastward of which is the bay of the same name.

Surprise Point.—Rocks above water extend a quarter of a mile to the southward of this point, and between it and the opposite point of Surprise bay is a rock just above high water, with a group of sunken rocks lying round it. South of Surprise point the land falls suddenly to 100 feet.

Surprise Bay is much used by sealers and small craft visiting the island. It affords good protection in all weathers for this class of vessels, the sea being broken upon the group of rocks in the centre of the bay. In strong westerly winds the bay cannot be entered.

TIDES.—It is high water, full and change, in Surprise bay at 0 h. 48 m.; springs rise 3 feet. An easterly gale had the effect of doing away with one flood tide, showing how the tides are influenced by the winds. *See* page 292.

STOKES POINT, the south extremity of King island, lies S.E. ¼ E. 8½ miles from Surprise point; its south extreme is only a few feet above high water, and has the appearance of a group of boulders, over and outside of which the sea is constantly breaking; there are a few sunken rocks South of the point at 1½ cables from the high-water line. At one mile North of the point the land has an elevation of 144 feet, and falls gradually on the opposite side to about 100 feet. In rounding Stokes point care must be taken to give it a good wide berth; the low shore at the south extremity and the rocks lying off it will appear more distant than they are in reality, in consequence of the gradually rising hill to the northward.

Seal Bay.—From Stokes point the eastern shore of King island trends northerly for about a mile, and then north-westerly half a mile to the sandy beach of Seal bay. Middle point, the north extremity of Seal bay, bears from Stokes point N. ½ E. 2¼ miles. Off Middle point half tide and sunken rocks extend in an E.S.E. direction for half a mile.*

Anchorage.—The anchorage in Seal bay is near the centre, in 7 to 8 fathoms water, over coarse sand of a loose nature, with the eastern part of Stokes point just open of the next point to the northward.

Seal bay, though seemingly protected from the prevailing winds, is actually exposed, for easterly winds are of more frequent occurrence here than on the Victorian coast; the bay has a bleak and warning appearance, and sealers never use it, as they prefer the safer anchorage upon the opposite side of the island in Surprise bay. Should a sailing vessel wish to anchor in Seal bay she is recommended to anchor in about 10 fathoms water, outside the anchorage ground above given. A swell setting into the bay, or indications of an easterly wind, should be the signal for a vessel to get under weigh.

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* *See* Admiralty plans of Anchorages in Bass strait, No. 1,694; scale, $m = 1 \cdot 0$ inch.

Seal rock, 12 feet high, lies N.E. by E. 1½ miles from Stokes point; at 1½ cables S. by E. ½ E. from Seal rock is a smaller rock which uncovers at low water; a few sunken rocks lie near it. East of Seal rock, at a distance of 1½ miles, are several rocky patches (Stanley rocks) with less than one fathom upon them; between these and Seal rock the general depth is about 7 fathoms, but there is one patch of 3 fathoms at 4 cables from the rock, and another of 5 fathoms at three-quarters of a mile. No shoaler water could be found, but in stormy weather the sea breaks the whole distance from Seal rock to the outer rocky patches.

The COAST.—Black Point lies N.N.E. ½ E., 3½ miles from Stokes point, and may almost be considered the north-east point of Seal bay. Over the point there is a hummock 113 feet high, and to the northward over the coast there is a higher range of conspicuous sandy hummocks. The point itself is a black rock about 30 feet high; and off it to the eastward, at half a mile from the point, but only one quarter of a mile from the nearest shore, is a rock above water, with sunken rocks between it and the shore.

Two miles N.E. ½ E. from Black point is another small point, at the back of which the land rises, and off which to the south-eastward, at a distance of 2 cables, is a small rock above water. At one mile N.E. ½ E. from the latter point is a smaller point, off which on a S.S.E. ½ E. bearing, and at a distance of 4 and 7 cables respectively, are the Brig and South Brig rocks. At the back of this piece of coast the land of King island attains its greatest elevation, namely, 700 feet.

Brig Rock, so called from its resemblance to a brig under sail, is 45 feet high; there is deep water between it and the shore, and between it and the South Brig rock.

South Brig Rock is 40 feet high, and of much greater extent than Brig rock; it has no resemblance to a vessel under sail, but is more easily seen, from its black appearance. A few detached rocks lie off it to the southward, and the sea breaks one cable off its south extreme. South Brig rock bears from Seal rock N.E. ½ N. distant 4½ miles. The shore abreast should not be closely approached in light winds on account of the swell which usually breaks upon the rocks fronting it.

Bold Point bears from South Brig rock N.E. by N. 5 miles. Several small points and bays occupy the space between; the first half of the distance has several rocks (most of them above high water) lying about 3 cables off the shore. Over the point the coast range has an elevation of 630 feet, and is densely timbered. Three-quarters of a mile S.W. by S. from Bold point there is a point with a small detached rock forming its south extreme; at a cable off this, are a few sunken rocks.

From Bold point the coast trends N. by E. 4 miles, and North 3 miles to the south point of Sea Elephant bay. This piece of coast is broken and almost steep-to. Small sandy beaches vary its rocky character, and over it are densely timbered ranges about 500 feet in height, which at the south point of Sea Elephant bay trend away to the north-westward.

SEA ELEPHANT BAY, nearly 6 miles broad, and 1½ miles deep, is open to the eastward; its extreme points bear from each other N. by W. and S. by E. Off its northern point, on an easterly bearing and distant 1½ miles is Sea Elephant islet, 75 feet high and nearly a quarter of a mile in extent. Between the point and the islet is a channel of about 3 fathoms water. At one mile N. ¾ E. from Sea Elephant islet is a rock which at very low tides is uncovered about 2 feet; there is foul ground round it, half a mile in extent. To the south-westward, at a cable's distance, is a rock above water, near which are a few sunken rocks.

Anchorage.—Sea Elephant bay affords a safe anchorage during westerly gales, and the wind invariably, when the weather is clearing, veers to the southward. The bottom throughout the bay is sand, or sand and shells, and vessels may anchor anywhere in about 9 fathoms, but the centre of the bay, in a line between its south point and Sea Elephant rock, is most convenient, where there is nothing in the way of a vessel getting to sea on the first appearance of a fresh breeze from the eastward. In the summer months there is much easterly weather, and a swell rolls in.

Water.—In the southern part of the bay there is a good fresh water stream. Also an abundance of firewood.

ELEPHANT BANK.—To the eastward of Sea Elephant bay, at nearly 7 miles from the shore, there is a bank having 22 feet water upon it; the bank generally has a depth of 4½ and 5 fathoms, sand, and at this depth is 3 miles long, in a N. by W. and S. by E. direction. From the northern or shoalest part Sea Elephant islet bears W. ½ N. about 4½ miles. Midway between the bank and the shore the water deepens to 12 and 14 fathoms, and thence shoals gradually again, until at half a mile from the shore 5 fathoms will be found. As the sea breaks heavily on the bank in strong winds, ships should approach Sea Elephant bay with caution.

TIDES.—It is high water, full and change, in Sea Elephant bay at 0 h. 50 m.; springs rise 3 feet. The flood stream runs to the northward and the ebb to the southward, at springs 1½ knots. The turn of the stream is influenced by the wind; in fine weather it occurs at high and at low water.

The COAST.—From the north point of Sea Elephant bay the coast consisting of low sand-hummocks, trends N. by W. ½ W. 9½ miles to Lavinia point. At one mile distant from the north point of the bay is Sea Elephant river, a small stream accessible at high water to small craft drawing 3 feet water; at the back is a swamp. Midway, and at 2 miles inland, is a double-topped hill, densely timbered, 338 feet in height, known as Sea Elephant hill.

Lavinia Point, the north-east extremity of King island, is low and sandy; thence the coast, which continues sandy, trends N.W. ½ W. 3¾ miles to Boulder point, so named from a large granite boulder which forms it. At 1½ miles to the north-west of Lavinia point is a conspicuous sand-patch. A few sunken rocks lie off Boulder point, and a shoal with 10 feet water, extends from the point N. by W. ½ W. three-quarters of a mile.

The meeting of the tides has caused a heaping up of the sand in the vicinity of Lavinia point, and it is not uncommon for coasters to anchor in westerly gales in about 9 fathoms upon the bank thus formed. If the gale should have settled into a westerly one this anchorage is as safe as Sea Elephant bay, and it is handier for proceeding westward when the weather clears.

At one mile to the north-westward of Boulder point is a large and conspicuous sand-patch, much more conspicuous than that between Lavinia and Boulder points.

Doughboy Rock.—The coast from Boulder point trends north-westward for 3 miles to another point, off which, at one cable, is a rock awash; W. by N. ½ N. 1¾ miles from the latter point lies a rock above water known as the Doughboy, having a reef dry at low water, and connecting it with the shore, from which it is distant 3 cables. Doughboy rock lies E. ½ S. one mile from cape Wickham. There is a passage of deep water between it and Navarin reef, but the tide often runs strong and causes a rip. The passage is not recommended.

SOUNDINGS.—The 30-fathoms line, commencing at about 4 miles N.W. of cape Wickham, just outside Harbinger rocks, follows the curve of the shore, and passes New Year islands at a mile distant, thence down the west coast of King island at about 3 miles from the shore until at 5 miles N.W. of Netherby point it is distant 5 miles from the adjacent coast. Here are 21 fathoms and 22 fathoms with much foul ground leading to the rocky patch of 6 fathoms already described. Thence the 30-fathoms line approaches the shore to within 3 miles of Netherby point, increasing its distance from the shore to 4 miles, but again nearing the land at Cataraque point, where it is distant only one mile. At Surprise point it is distant only half a mile, and at Stokes point nearly a mile, whence it becomes a very irregular line trending first easterly, and then towards Reid rocks. *See* page 295.

At 6 miles W. by S. from Stokes point there is a rocky patch, on which not less than 10 fathoms were found; it is not, however, unlikely that the sea breaks here in bad weather.

On the east side of King island the soundings are less than 30 fathoms. Twenty-one miles to the eastward of Sea Elephant bay is a depth of 25 fathoms, sand, and 23 miles to the eastward of Lavinia point 24 fathoms, fine white sand. From these positions towards the shore the water appears to shoal very gradually, while off-shore it appears to deepen as gradually. Northward of the island the 30-fathoms line is 2 miles North from cape Wickham, passes Navarin reef a mile distant, and trends easterly.

CURRENTS and TIDES.—Off cape Wickham there is occasionally a very strong current, which may be more correctly termed a tidal stream accelerated by the wind. Close to the cape it is said to run occasionally as much as 5 knots, but 2 knots is the ordinary velocity at spring tides.

The current loses in force as its distance from the shore is increased. It is probable that a westerly gale will keep up the flood stream which here sets to the eastward, and an easterly gale will have an opposite effect.

Southward and westward of King island the currents or tidal streams are irregular; they are known at times to be very strong, but they were never experienced of any strength during the survey of the island.

Sealers report that in the strait between King island and Tasmania a current will be found setting eastward during easterly weather; if this be so in the centre of the strait it is likely that in-shore on both sides there is a stream setting in an opposite direction.

CAPE OTWAY TO PORT PHILLIP.

PARKER RIVER.—From cape Otway the coast trends E. by N. 2 miles to Franklin point, which is low and sandy, with some rocks lying near it. At three-quarters of a mile northward of this point is the mouth of the small river Parker, at which the Victorian end of the Tasmanian electric cable is secured, and where the lighthouse stores are landed. As there is usually a heavy surf at the mouth of the river, it is dangerous to attempt a landing there.

The COAST.—From Franklin point the coast trends nearly N.E. ¼ N. 43 miles to Addis point, and begins with high dark-coloured cliffs, backed by densely wooded hills, rising to the height of 2,297 feet, at N.N.E. ¾ E. 25 miles from cape Otway, and extending to within 5 miles of Addis point. At about 8 miles north-eastward of Addis point the coast changes to sand-hummocks, backed by undulating hills, with patches of wood, and farm-houses.

From Blanket bay, a small bight 1½ miles N.E. by N. of Parker river, the coast trends N.E. by N. and East 4 miles to Storm point, and from thence N.N.E. ½ E. 2¼ miles to Bunbury point. Hayley reef, just above high water, projects half a mile from the shore between the two points.

HENTY REEF,* N.E. ¾ E. 9¾ miles from cape Otway lighthouse, is a dangerous reef, with 18 feet water over it, on which the sea breaks heavily in moderate weather. It is steep-to, with 6 to 10 fathoms all round within a cable of its shoalest part.

Beacons.—The position of Henty reef is shown by the intersection of two lines drawn through four pillar-beacons on the mainland, each surmounted by a ball; two of them, which stand East and West 200 yards from each other, with the inshore one painted white, and the outer black, being N.E. by N. two-thirds of a mile from Storm point, and S.W., one-third of a mile from Hayley point; the other two beacons being on Bunbury point, bearing S.E. ¼ S. and N.W. ¼ N. from each other, the inner one painted white, and the outer red.

Directions.—If bound to the north-east, the black beacon near Storm point must be kept well open northward of the white one, until the white beacon on Bunbury point opens well to the north-eastward of the red beacon. In proceeding to the south-west, keep the outer or red beacon on Bunbury point well open southward of the white one, until the white beacon near Storm point is well open south-westward of the black beacon.

APOLLO BAY,* on the north-east side of Bunbury point, lies just under a high part of the Otway range, and may also be known by the beacons on the point, and the few houses at the northern part of the bay. There is generally a heavy swell in the bay.

A reef, on which the sea breaks, extends off Bunbury point for one-third of a mile.

Anchorage.—There is anchorage during westerly winds in Apollo bay, in from 4½ to 6 fathoms water. Vessels must be prepared for a change of wind to the South or S.E.

Moorings.—A red mooring buoy has been placed in 28 feet water, at about 2 cables N.E. of the jetty.

Cape Patton, N.E. ½ E. 8½ miles from Bunbury point, is a bold dark-looking wooded head, at S.W. 1½ miles from which a 2 to 3 fathoms shoal projects half a mile from the shore; and at N.E. ¼ N. 1½ miles from the cape, a 12 feet spit extends half a mile from Hawdon point. From this point the coast extends N.N.E. ¾ E. 9 miles to Grey point, a low grassy projection, with a reef extending one third of a mile from it, and forming the south side of Louttit bay.

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* *See* Admiralty plans of Anchorages in Bass strait, No. 1,694.

LOUTTIT BAY[*] may be recognised by a square land-mark 30 feet high, surmounted by a staff and ball, and erected on the adjacent coast range. Louttit reef, with 6 to 10 fathoms water on it, extends off Grey point E. by N. 1¼ miles.

Anchorage, in 4 or 5 fathoms water, may be obtained in Louttit bay. The anchorage in this bay is preferable to that in Apollo bay, there being less swell. Sailing vessels anchoring in this bay, with westerly gales, must prepare for a change of wind, as it often chops round to South, and sometimes to S.E.

Moorings.—A 12 cwt. anchor and 45 fathoms of 1¼ inch chain have been placed in Louttit bay in 3½ fathoms water, about 4 cables to the N.W. of the reef off Grey point. A small red buoy marks the end of the mooring chain. Vessels are not to ride by the small chain attached to the buoy.

Split Point (Eagle Nest point), N.E. ¼ N. 7 miles from Grey point, is of a reddish-brown colour, and appears like three cliffs close together, divided by dark ravines. Eagle Nest reef, which is awash, projects half a mile from the shore at two-thirds of a mile north-east of Split point.

Demons Bay.—Between this reef and Addis point, at N.E. ½ E. 7½ miles from it, the coast forms two bights, separated by Roadnight point, the north-eastern being Demons bay. At N. by E. one mile from Roadnight point is a creek, with a sunken rock close off it, between which and Addis point there are two rocks above water.

Addis Point.—From Addis point the coast trends N.E. ¼ N. 5 miles to Zealey point, from whence it curves N.E. and East 9½ miles to Barwon head.

Victoria Reef, on which there are 15 feet of water, lies E. by N. ¾ N. 1¼ miles from Zealey point, with which it is connected by a bank, that continues along the coast to Barwon head; at midway it only extends a quarter of a mile from the shore. Ant spit, on which there are 12 feet water, projects from this bank to 2¾ miles W. by S. of the head.

BARWON HEAD is a saddle-shaped scrubby hummock 122 feet high, appearing from seaward like an island, on account of the low land in its rear. This head forms the south side of Barwon river, which boats can only enter with very smooth water. On the northern bank of this river, at about 10 miles to the north-westward of its mouth, is situated the important town of Geelong.

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[*] *See* Admiralty plans of Anchorages in Bass strait, No. 1,694.

An Automatic signal buoy has been placed off Barwon head, west side of entrance to port Phillip. The buoy is moored in 12 fathoms water, with Barwon head bearing N.W., distant about 1½ miles. Mariners are requested to report as to the working of this buoy.

Charlemont Reef, S.W. by W. one mile from Barwon head, is a detached 9-feet patch, with deep water about it.

The COAST.—From Barwon river a continuation of the low sandy shore curves eastward nearly 6 miles to Lonsdale point, the outer western entrance point of port Phillip. A spit, having 9 to 15 feet water on it, projects one mile eastward from the mouth of the river, from whence a continuous rocky shoal, nearly half a mile broad, with 6 to 16 feet water on it extends to Lonsdale point. From the edge of this shoal to 3½ miles off shore the soundings gradually increase to 28 and 30 fathoms.

PORT PHILLIP* includes all inlets, rivers, bays, and harbours contained within a line drawn from Lonsdale point to Nepean point, and not included in the ports of Melbourne the metropolis of the colony of Victoria, and Geelong. It is situated at the head of an extensive bight between cape Otway on the west, and Wilson promontory, 130 miles to the eastward of the cape. In approaching the port from the westward, the entrance is not easily distinguished until Nepean point, the eastern entrance head, bears N.N.E., when Shortland bluff, on which the highest and leading lighthouses are erected, shows out, and the estuary becomes visible. If Barwon head is previously seen, the entrance of port Phillip is easily found by its relative position with that head.

Port Phillip extends about 32 miles, North and South, and is 18 miles wide, exclusive of an arm which trends 16 miles in a W.S.W. direction to Geelong, the port being capable of receiving and sheltering a large number of ships ; but the entrance is less than 2 miles wide, and nearly one-half of it is occupied by rocks and shoals.

LONSDALE POINT, the western head of the entrance to port Phillip, is low and juts out from a dark rocky cliff, it being neither so high nor so well marked in outline as Nepean point, the eastern head; but can now be easily distinguished by a light, look-out house, and a tidal flag-staff.

Telegraph Station.—There is a telegraph station on Lonsdale point.

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* *See* Admiralty chart of port Phillip, Southern sheet, No. 1,171a; scale, $m = 1$ inch ; also plans : Entrance to port Phillip, No. 2,747 a and b ; scale, $m = 3$ inches ; and Bass strait, No. 1,695b ; scale, $m = 0{\cdot}2$ of an inch.

Lonsdale Reef, the greater part of which dries at low water, projects a quarter of a mile south-eastward from Lonsdale point, and is about 200 yards broad, having dangerous rocky patches extending nearly 400 yards farther to the south-eastward, with 5 fathoms water close outside them.

LIGHT.—On Lonsdale point, from the lighthouse which is near the telegraph station, and painted red and white in alternate bands, is exhibited a *fixed green* and *red* light, which can be seen in clear weather for a distance of 10 miles. The *green* light is visible to seaward when bearing about N. by W. to N.W. ½ W.; and the *red* towards Nepean point, and the harbour when bearing N.W. ½ W. to W. by S.

Vessels having the *green* light in sight will be outside, and with the *red* in sight, inside Lonsdale rock, which bears S.E. ½ E., distant nearly two-thirds of a mile from the light. The blending of the two colours when seen from a vessel will show that she is in the vicinity of, or in line with this danger; great caution will therefore be necessary before these colours begin to blend.

Rocket Apparatus.—There is a rocket apparatus in readiness in case of shipwreck.

PILOTS.—There is a pilot establishment at port Phillip heads; the vessels are fore-and-aft schooner and cutter-rigged, painted a light stone colour, each with her number on her main-sail. They cruize from 3 to 12 miles outside the heads, borrowing on either shore according to the weather; and one of them is constantly outside when there is a possibility of keeping the sea. The boundary of the cruising station is the extremity of a line 12 miles from the centre of the Heads N.E. by N. and S.W. by S., Bream creek bearing therefrom N.W. by N., and cape Schank, East. The pilot-vessels carry at the main mast-head by day a red and white flag in horizontal stripes, and between sunset and sunrise exhibit a bright light at the fore mast-head, and show in the waist a flash-light every quarter-hour.

Signals.—Vessels steering for port Phillip are bound to show the usual signal for a pilot when within 12 miles of the entrance, and, if the pilot-vessel be in sight, they must allow a reasonable time for a pilot to board. Vessels which miss the pilot-vessel will be boarded by a pilot from a whale-boat, when they are inside Lonsdale point. But no stranger should attempt to enter without taking a pilot; although the channels are so carefully lighted and buoyed that it is quite possible to do so.

At night, vessels requiring a pilot should show a blue light *every fifteen minutes*; or a bright white light flashed or shown at *short* or *frequent* intervals, just above the bulwarks, for about a *minute* at a time.

Vessels which are exempt from pilotage must, on arriving within 12 miles of the entrance, have a large white flag flying at the main mast-head until past Swan point, 6 miles within the entrance, under a heavy penalty, to prevent the pilots' time being unnecessarily taken up running after vessels which do not require their services.

Tidal Signals are shown at Lonsdale point, denoting the quarter of the tide with reference to the stream: in the middle of the entrance between Lonsdale and Nepean points the period of slack water is very limited. Within the heads the tides are most irregular, the narrow entrance to the large basin within checking the fair course of the tidal wave; hence after southerly gales it may be high water all day, and the contrary with northerly gales. The stream turns from two to three hours after high and low water by the shore.

The Flood,	during the	first quarter	is denoted by a	blue flag half mast.
„	„	second quarter	„	at mast-head.
„	„	third quarter	„	red flag half-mast.
„	„	fourth quarter	„	at mast-head.

Ebb.—The same signals are used for the four quarters of the ebb; with a ball below the flag.

By attention to these signals a ship-master will know the true state of the tide, which cannot be always ascertained by the usual process of finding the time of high-water, the strength and duration of the tide being so much influenced by the wind and weather.

The signal-keeper has instructions, if he sees vessels approaching the heads and running into danger, to warn them by signalising; strangers should therefore watch these signals.

The velocity of the tides at the entrance, is from 5 to 7 knots, depending on the winds and freshets. *See* pages 359, 360.

Tidal signals for South channel, *see* page 318.

NEPEAN POINT.—The eastern head of the entrance to port Phillip is the narrow western termination of a peninsula, which extends 15 miles in a westerly direction from Arthur's Seat, and consists of a series of sand-hummocks slightly covered with low bushes, and having a white beacon on its extremity.

Nepean Reef and Rock.—Nepean reef projects West nearly 400 yards from Nepean point to Nepean rock, a small islet, on which is a red cone-shaped beacon; from thence a continuation of the reef and several pinnacle rocks outside it extends 700 yards farther westward to Corsair rock, at 150 feet to the N.N.E. of which is a small detached rock with 10 feet water on it. Nepean reef dries at low water out for 700 yards from the point.

The northern edge of the rocky ledge along Neapean reef trends from Corsair rock E. by N. to 200 yards northward of Neapean point. The coast outside Nepean point is bordered by a continuation of this reef and numerous rocks; but they do not exteend more than 200 to 300 yards from the shore, which may be approached to a third of a mile in 5 fathoms.

Corsair Rock, which may be considered as the outer end of Nepean reef, is 20 feet in diameter, having 8 feet water over it with 3, 4, and 5 fathoms close to; this rock lies with the red beacon on the rocky islet in line with the white beacon on Nepean point, bearing East, the red beacon distant 3½ cables.

ENTRANCE.—The entrance to port Phillip, between Lonsdale and Nepean points is 1¾ miles wide, but the navigable channel is contracted to a little less than one mile in width between the reefs that project from Lonsdale and Nepean points.

Lonsdale rock, S.E. ¼ E. a little more than half a mile from Lonsdale point, having 18 feet water on it, lies in the western limit of the fair way.

Lightning rocks, W. by S. ¾ S. one mile from Nepean point, have been removed, and there is now a least depth of 32 feet over and around their positions:—

Also, the depths—over the patches of 25-28 feet, 28 and 29 feet, which existed about 3½ cables north-west of the position of Lightning rocks; and over that of 29 feet about 2 cables south-east of that position—have been increased to 30 feet.

Caution.—Outside the bank there are 9 to 14, and inside 10 to 47 fathoms. This great inequality, with tide streams at times running 5 to 7 knots, causes the well-known Race, or "*Rip,*" between port Phillip heads, which during or immediately after a north-westerly gale breaks so furiously as to be dangerous to small vessels.

DIRECTIONS.—Leading Marks.—The two lighthouses on Shortland bluff in line, N.E. by N., lead through the fairway of the entrance into port Phillip in not less than 29 feet.

The two beacons in Lonsdale bight kept in line N.N.W. ¼ W. lead in with not less than 42 feet at low water spring tides. *See* page 346.

To clear Lonsdale Reef.—Vessels drawing less than 14 feet may, in the daytime, pass between Lonsdale reef and rock by keeping Swan point just open east of Shortland bluff, bearing N.E. northerly.

Swan beacon (white with a red top) open of Shortland bluff, bearing N.E. ½ N., leads half a cable to the eastward of Lonsdale rock.

To clear Corsair Rock.—The Corsair rock, off Nepean point is cleared by keeping the low lighthouse on Shortland bluff in line with the east end of the light-keepers' houses, near the high lighthouse N.N.E. ¼ E., until the white beacon on Nepean point is well open to the northward of the red beacon, when going in, or well open to the southward, when going out.

The Western Shore of port Phillip from Lonsdale point curves northward and eastward, forming a bay which extends from the point N.E. by E. 2⅓ miles to the south extreme of Shortland bluff, and is three-quarters of a mile deep; it is mostly occupied by shoals with irregular soundings between them, extending from the shore to a line from Lonsdale point to Shortland bluff; the only part of the bay which appears free from shoals and has tolerably regular soundings, is within about one mile of Shortland bluff; even here no anchorage is recommended.

At three-quarters of a mile to the northward of Lonsdale point is a cemetery, near the shore, from which a low coast-range extends to Shortland bluff. The electric telegraph passes close along the shore, and behind the coast-range from Lonsdale point to Shortland bluff.

Victory Shoal lies nearly in the centre of the above bay, its outer edge, on which there are 11 to 14 feet water, being in line between Lonsdale point and Shortland bluff; the least depth of water on the shoal is about 6 feet.

Queenscliff, at the entrance of port Phillip, is about 32 miles South from Melbourne by water, and 65 miles by land. Two trains run daily to and from Geelong, 20 miles distant; and a steam vessel plies three times a week to and from Melbourne. When the weather permits the intercolonial steam vessels embark and disembark passengers. All vessels arriving from foreign ports are boarded here by the health officer. It is much used by visitors as a watering and bathing place. The population numbered 1,300, in 1881.

SHORTLAND BLUFF, on which are two lighthouses and a red obelisk, with the township of Queenscliff in their rear, is the south-east extreme of a peninsula projecting nearly 2 miles in a north-easterly direction from the line of coast, from which it is separated by an isthmus little more than 200 yards broad. The peninsula is about half a mile broad at Shortland bluff, from whence it gradually contracts to the north-eastward, where it terminates in a low narrow point.

LIGHTS.—The high lighthouse on Shortland bluff, which bears N.E. ¾ E., distant 2½ miles from Lonsdale point, is a tower 81 feet high, built of blue stone, which retains its natural colour. It exhibits a *fixed white* light 130 feet above the sea-level, and is visible from seaward, on any bearing between about E. by N. and North at the distance of 17 miles, in clear weather; but when close in with Lonsdale land it will only be seen when bearing between N.E. by E. and North. Within port Phillip heads the light will be visible when bearing from N.E. by E. round by north and west, to S.W. by W.

Low Light.—The low lighthouse tower, with a red lantern, stands S.W. by S. 352 yards from the high lighthouse, and at the height of 90 feet above high water level exhibits a *fixed red* and *white* light, showing *white* when bearing from about N.E. by E. to N.E. *red* from N.E. to N.N.E., and *white* from N.N.E. round by north, to W. by. N. The *white* light should be seen in clear weather at a distance of 14 miles, and the *red* at 10 miles.

Vessels entering between port Phillip heads should keep the *red* light in sight, and steer with it bearing N.E. by N. in line with the high *white* light. The change of colcur from *red* to *white* indicates an approach to Lonsdale reef on the west, and to Nepean reef on the east side of the entrance.

The *white* light between the bearings of N.E. by E. and N.E. shows over the dangers extending from Lonsdale point. Between the bearings of N.N.E. to W. by N. the *white* light shows over the Corsair rock to a line from the low lighthouse along the north side of and through the South channel, passing to the southward of Pope's Eye and at a cable to the northward of the red buoy, and along the black buoys which mark the north side, and to the northward of the white buoys on the south side of the channel, so that vessels during night, with light winds or adverse tide streams, will be aided by a bearing of the light.

Additional Sector.—A sector of *red* light is exhibited from Shortland bluff low lighthouse, Queenscliff, visible between the bearings of about S.W. by W. ½ W. and S.W. by W. ¾ W.—or from Black buoy No. 1., to Perch buoy No. 2, at the entrance to West channel.

This sector of light is intended as a guide in the fairway from Swan spit to between buoys Nos. 1 and 2, thus, so far, will meet the requirements previously fulfilled by Swan spit lighthouse (destroyed); but will not be of service in judging the distance from Shortland bluff reef.

Vessels leaving, should haul sufficiently to the eastward when Queenscliff jetty light bears about W. by N., to clear Shortland bluff reef.

Queenscliff Jetty Light, at N.N.E. nearly half a mile from the high lighthouse, projects about 130 yards from the shore, and has a *fixed green* light at its end, visible at a distance of 4 miles.

Life-boat.—There is a life-boat station at Queenscliff jetty.

Swan Island, which is low, and has several small lagoons, is separated from the north-east point of Shortland peninsula by a shallow opening

100 yards wide, communicating with Swan bay to the westward. From this opening, the south side of Swan island trends nearly E.N.E. 1½ miles, and from thence the eastern end sweeps three-quarters of a mile northward, round Swan point, to the north-east extreme of the island. Swan island is nearly 2 miles long, E.N.E. and W.S.W., and one mile across at its broadest part; but it is nearly divided in two by a bight, with a small islet in it, on its northern side. There are three islets close to the south-west extreme, and another close to the north point of Swan island.*

Queenscliff Bight.—Between Shortland bluff and the south-east extreme of Swan island the shores form a bay extending 2 miles N.E. and S.W., and is half a mile deep; but it is fronted by a bank having irregular depths of 3 to 12 feet water on it, the outer edge of which, from 1½ cables off Shortland bluff, trends nearly N.E. by E. 1½ miles to black buoy No. 1, and from thence three-quarters of a mile farther in a N.E. ½ E. direction to Swan-spit light vessel.

Many shoal patches, with from 3 to 6 feet upon them, have formed in Queenscliff bight since the Admiralty survey made in 1864. The two outer patches, each 300 yards in extent, are on a line joining Queenscliff high lighthouse and Swan-spit light vessel, and are 4 cables apart; the south-westernmost being 1¼ miles from Swan-spit light vessel.

The coast in Queenscliff bight has extended outwards about 150 yards, and is now partially covered with grass.

Clearing Mark.—To clear the edge of the bank and the shoals just noticed, keep Lonsdale lighthouse open of Shortland bluff.

Swan Beacon, which, when open of Shortland bluff, bearing N.E. ½ N. leads clear of Lonsdale rock, is white with a red top, and is situated near the south-east extreme of the island, the high lighthouse on Shortland bluff bearing nearly S.W. ½ S., distant a little less than 2 miles.

Swan-spit has extended to the southward.

A shoal, upon which at present there is a depth of 6 feet, is also forming at 1¾ cables N. by E. ½ E. from the site of the lighthouse which has been destroyed, and the same distance N.W. by N. from the light vessel.

Buoy.—A chequered buoy is placed, when necessary, in West channel, on the shoalest part of the banks which are constantly forming and shifting in position off the elbow of Swan spit, to the northward of No. 4 white buoy.

LIGHT VESSEL.—Swan-spit lighthouse was totally destroyed by collision on the 14th September 1881. Until the lighthouse is replaced a light vessel is moored in the position of the black buoy (one cable E.N.E. of the site of the lighthouse), from which is exhibited a *fixed red* light, visible in clear weather from a distance of 8 miles. A gong is sounded every 10 minutes in thick or foggy weather.

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* Swan island is gradually being washed away, the sand from it apparently filling up Queenscliff bight, and not in any degree forming banks in West channel.

Swan Bay is a large shallow lagoon, extending from the isthmus behind Queenscliff N.N.E. 5½ miles, and 1¼ miles across, with an opening 1¼ miles wide, between Swan island and a narrow tongue of land projecting nearly 1½ miles from the N.N.E., its extremity forming the northern extrance point of the bay.

From the north extreme of Swan island a mud-flat stretches nearly across the opening to Duck islet, between which and the northern entrance point is a narrow boat channel, having 6 to 14 feet water, marked by white beacons on the north-east side, and by a black beacon on the south-west side of the entrance ; but a bank extends from the north-east extreme of Swan island to the northern entrance point, forming a 3-feet bar across the mouth of the boat channel.

The eastern side and southern part of Swan bay are mostly occupied by mud-flats, leaving only portions of the western shore accessible even to boats; there being generally not more than 2 to 5 feet water in the bay.

The Western Shore* of port Phillip from the northern entrance point of Swan bay extends nearly N. by E. 2½ miles to South Red bluff, and from thence about three-quarters of a mile farther in the same direction, to a point, close to the northward of which St. Leonards jetty projects into about 8 or 9 feet water. A continuation of the bank which stretches northward from Swan island borders this shore, from which it projects 200 to 300 yards, with 2 to 6 feet water on it. The 3-fathoms edge of the shoal water, which extends about one-third of a mile from the shore, between the entrance of Swan bay and the point of St. Leonards, forms the northern portion of the west side of Coles channel.

St. Leonards is a small fishing village, 24 miles south-west of Melbourne, with a population in 1881 of about 100 persons.

Light.—A *fixed green* light is exhibited from the end of the jetty at St. Leonards, which should be visible in clear weather from a distance of 3 miles.

Buoy.—A black buoy is placed to mark a shoal, which has formed at 2 cables S.E. of St. Leonards jetty.

George Point.—From the point of St. Leonards the shore, after extending N. by W. ½ W. 1¼ miles to North Red bluff, trends N.N.E. one-third of a mile to Indented head, from whence it recedes in a N.W. ½ N.

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* *See* Admiralty chart of port Phillip, Northern Sheet, No. 1,171b; scale, m = 1 inch.

direction 1½ miles to George point, close to the northward of which is White Woman rock. From the point of St. Leonards to George point a shoal, with 2 to 3 feet water on it, borders the shore, from which it extends about 200 to 300 yards.

Governor Reef is a patch with one foot water on it, marked by a beacon, from which North Red bluff bears W. ¼ N., distant nearly two-thirds of a mile. At about one-third of a mile to the north-westward of the beacon, and E.S.E. nearly a quarter of a mile from Indented head, is another patch, which dries one foot.

Prince George Bank.—From half a mile off the point of St. Leonards the 3-fathoms edge of the shoal water, which extends from the shore, trends in a N. by E. direction to two black buoys, which mark the edge of the bank, and lie respectively S.E. by E., and E.N.E., each distant half a mile from the beacon just noticed. From the northern of these two buoys the eastern 3-fathoms edge of the bank extends irregularly, in a N. by W. direction 2½ miles to the north-east extreme of Prince George bank; at a quarter of a mile off which is moored a black buoy in 6 fathoms water, bearing N.E. ¼ N., a little more than 2 miles from George point.

From the north-east extreme of Prince George bank, its northern edge, after trending half a mile to the north-westward, extends, with a sligth southerly curve, 3 miles in a W. by S. direction, to a quarter of a mile off the shore to the westward. There are two 4-feet patches on the northern edge of the bank nearly in line with the black buoy bearing E. by N. ¾ N., from which one patch is distant two-thirds of a mile, and the other 1¼ miles.

THE SOUTHERN SHORE[*] of port Phillip from Nepean point to Oservatory point, E. ¼ S. 1¼ miles from it, forms a bight a quarter of a mile deep; but the depth of water in it does not exceed 17 feet, and there are numerous sunken patches; the 3-fathoms edge of this shallow water and foul ground extends from the shore to a cable outside the line of the points of the bay.

Observatory Point and Sanitary Station.—There is a flag-staff on Observatory point, which marks the western boundary of the Sanitary station, and from this flag-staff the shore extends E. by S. ¾ S. nearly 1¼ miles to another flag-staff, the eastern boundary of the station. A jetty projects from the shore at 4 cables West of the eastern flag-staff.

From the eastern flag-staff the shore trends E. ½ S. three-quarters of a mile to Franklin point, the eastern point of Weeroona bay; in the depth of the bay, at Portsea, there is a small jetty, and a red buoy lies 2 cables from the shore, southward of a spit of 23 feet. From Franklin point the coast takes an E. by S. ½ S. direction to King point. Between the two flag-staffs the shore may be approached to one cable, but eastward of Franklin point, a shoal extends 1½ cables from the shore, and is steep to.

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[*] *See* Admiralty charts, port Phillip, Southern Sheet, No. 1,171a; scale, *m* = 1 inch; also, port Phillip entrance, No. 2,447 a and b; scale, *m* = 3 inches.

The Quarantine Ground extends along the shore between Observatory point and King point, the anchorage being in 8 and 9 fathoms at three-quarters of a mile from the shore.

Caution.—Strangers who through stress of weather bring up here or at the anchorage off Shortland bluff, should not attempt to proceed above these anchorages without a pilot, as a collection of banks, with intricate channels, extends 8 miles in all directions above these anchorages.

Nicholson Knoll is a sand-ridge near the Quarantine ground about 200 yards in extent, North and South, with 3 fathoms water over it and 5, 6 and 7 fathoms close to. It is marked by two black and white chequered buoys, moored on the extremities of the knoll, N.N.W. and S.S.E., 1½ cables apart, with an average depth of not less than 19 feet between them. From the northern buoy the flag-staff at the east end of the Sanitary station bears S. by W. ¾ W., and Shortland bluff high lighthouse nearly N.W. by W. ½ W.; from the southern buoy, the flag-staff bears S.S.W. ½ W. two-thirds of a mile.

Clearing Marks.—To pass to the northward of Nicholson knoll, keep Nepean point red beacon a little open North of the point. To pass to the southward of the knoll, shut the red beacon in with Nepean point. When the eastern flag-staff of the Sanitary station bears S.W. by S., a vessel will be eastward of the knoll.

Portsea, a much frequented sanatorium and watering place, 62½ miles by road from Melbourne, between which place and Portsea a coach travels and steam vessels also ply. A mooring buoy painted red is placed in 15 feet water at 450 feet E.N.E. of the jetty. There is a telegraph station here. Population in 1881, about 200, many of whom are lime burners.

LIGHT.—A *fixed red* light is exhibited from the outer end of the jetty at Portsea, visible 8 miles in clear weather.

The shore from King point curves S.E. ½ E. about 1¾ miles to the Sisters, a double point, from the east side of which the coast, after trending E. by S. ¾ S. 2½ miles to White cliff, takes an E. by N. ¾ N. direction for 6½ miles to the foot of Arthur's Seat. Between King point and the Sisters is Sorrento jetty.

Aspect.—The land from Nepean point to White cliff has hills 100 to 225 feet high scattered over it, with numerous lime kilns, wells, and some ponds. Between White cliff and Arthur's Seat the country is flat, and at 3 miles to the eastward of the cliff it appears to be swampy, with a creek intersecting the shore midway between White cliff and Arthur's Seat. Half a mile eastward of White cliff is Rye jetty.

Banks.—From King point to White cliff the coast is fronted by a bank mostly of sand with weeds, extending, midway, 2½ miles from the shore. This bank has generally 8 to 10 feet water upon it, with some small hollows of deeper water, and numerous knolls, on some of which there are only one to 6 feet water. Between the south-east extreme of this bank and White cliff is the entrance of an inlet one quarter to half a mile wide, with 4 to 9 fathoms water, trending along shore towards King point; but a bar of from 8 to 10 feet extends from King point to the shoal bank eastward. This passage is buoyed.

The western spit of the bank is marked by No. 2 white buoy bearing N. by W. ½ W., distant 8 cables from King point; and between them a bight, having 6 to 3 fathoms, trends one mile eastward into the bank; from No. 2 white buoy the northern edge of the bank extends East 1¾ miles to No. 4 white buoy, and from thence E. ¼ S. 1¼ miles to No. 6 white buoy, moored close to the north-east extreme of the bank, from which its eastern edge sweeps round in a S.E. by S. direction 1¾ miles to about N. by W. three-quarters of a mile from White cliff.

Two other banks extend together, 2 miles eastward from the large one, from which they are separated by a narrow channel one mile long, with 3½ to 8 fathoms in it. These two banks are nearly divided by a narrow inlet three-quarters of a mile long, N.W. and S.E. having 5 to 3 fathoms water. The northern edge of the easternmost and smallest bank is marked by No. 8 white buoy, bearing nearly E. ¾ S. distant 1½ miles from No. 6 white buoy. From the easternmost bank a spit, with 3½ fathoms on it, projects E. by N. rather less than three-quarters of a mile to the pile lighthouse, which bears East, distant one mile from No. 8 white buoy.

Sorrento is a watering place, 40 miles from Melbourne by sea. The population in winter is about 200 and in summer 400. A coach runs to Melbourne, and in the summer steam-vessels ply daily between the two places. There is a telegraph station here.

Light.—From the end of Sorrento jetty which runs out into 12 feet water, a green light is exhibited from a lamp post, and in clear weather should be seen from a distance of 2 miles.

CAPEL SOUND is a clear space 2 miles long, East and West, and 1½ miles wide, bounded to the northward by the two easternmost banks just described, and to the southward by the coast extending eastward from White cliff. There are regular soundings in 6 to 8 fathoms throughout the greater portion of the sound, over a bottom of sand and shells and mud; but shoal water extends from a quarter to one-third of a mile off the southern shore.

From Capel sound to Arthur's Seat the shore continues bordered by a shoal one-third of a mile broad, the soundings increasing from 3 fathoms at the edge of the shoal to 7 fathoms at 1½ miles from the shore, over a bottom of sand and shells.

Anchorage.—Vessels bound up, and caught in South channel by a northerly or north-west gale, will find anchorage in 5 to 7 fathoms in Capel sound, with White cliff bearing S.W. and the top of Arthur's Seat East; but, if daylight permit, it would be better to run back to the anchorage off Shortland bluff lighthouses.

By night vessels may find safe anchorage in Capel sound with the Pile light showing *red*.

ENTRANCE BANKS AND CHANNELS.—For the first 2½ miles within the heads the estuary is free from dangers, but above that distance, where it widens between North and East, it is crowded with sand-banks, radiating nearly 8 miles from their southern and western extremes. Between these banks there are several channels, three only being buoyed, namely, the South, West, and Coles channels; the others are narrow and intricate.

LIGHT.—The South channel pile light at the eastern end of the channel in the position formerly occupied by No. 10 buoy, is a *fixed* light showing *red* between the bearings W. ½ S. through north to N.E. ¼ N., and *white* between N.E. ¼ N. and S.S.E.; between S.S.E. and W. ½ S. the light is obscured; it is elevated 27 feet above the level of high water, and in clear weather the *white* light should be seen from a distance of 10 miles.

TIDAL SIGNALS.—The following tidal signals are exhibited from the Pile lighthouse in the South channel, indicating the depth of water in the deepest or northern side of the channel, in the vicinity of the lighthouse:—

From SUNRISE to SUNSET.

	Ft.	Ins.
One blue flag	25	0
One ball	25	6
One ball with blue flag over	26	0
One ball with blue flag under	26	6
Two balls	27	0
Two balls with red flag under	27	6
Two balls with red flag over	28	0
Two balls with red flag between	28	6
One red flag	29	0

From SUNSET to SUNRISE.

	Ft.	Ins.
One green light - - - -	25	0
One white light - - - -	25	6
One white light with green light over - -	26	0
One white light with green light under -	26	6
Two white lights - - - -	27	0
Two white lights with red light under - -	27	6
Two white lights with red light over - -	28	0
Two white lights with red light between -	28	6
One red light - - - - -	29	0

SOUTH CHANNEL.—The South, or great ship channel, is bounded to the southward by the northern edge of the three banks last described, along which are placed the four white buoys marked with even numbers, from 2 to 8 inclusive, and the pile lighthouse at the easternmost end of the spit. The channel is bounded on the north side by the southern edge of Great sand and Middle ground, defined by eight black buoys, marked with odd numbers, from one to 15 inclusive, the first and last being each surmounted by a staff and ball.

From No. 1 black buoy Observatory point flag-staff bears S.W. ½ W., and the high lighthouse on Shortland bluff W. by N. ¼ N. From this buoy No. 15 black buoy bears E. ½ S., distant 9 miles, the respective distances between the intermediate buoys varying from nearly 2 miles between Nos. 3 and 5, to one mile between Nos. 11 and 13. From No. 1 the buoys are nearly in line to No. 13, bearing E. ¾ S.; but from No. 13, No. 15 black perch buoy bears E. by N. distant about one mile.

South channel is one mile wide at its western entrance, between No. 2 white buoy and No. 3 black buoy, and half a mile wide abreast of No. 6 white buoy; but only a quarter of a mile wide at its eastern entrance, between the pile lighthouse and No. 11 black buoy. The soundings in the channel are very irregular, varying from 10 fathoms in the middle of the western entrance to 20 fathoms at 1½ miles farther to the eastward; from thence the depth varies from 11 to 16 fathoms between No. 4 white and No. 5 black buoys; the soundings then gradually decrease eastward to 4 fathoms in the eastern entrance, between the pile lighthouse and the Middle ground westward of No. 11 black buoy.

A shoal, 200 yards in length north and south, and 100 yards in width, with 21½ feet water on it, lies on the north side of South channel; it bears from No. 1 buoy S.E. by E. ¾ E., and from No. 3 buoy nearly West.

This shoal is supposed to be that on which the steam ship *Great Britain* touched some years since; its shoalest part is 1½ cables south of a line joining buoys, Nos. 1 and 3; and 2¼ cables northward of the South channel fairway, indicated by the leading lights in line bearing E. ¾ S.

The flood stream sets through South channel one to 1¼ knots, and the ebb three-quarters of a knot to 2 knots.

Middle Ground.—The southern edge of this bank extends nearly 5½ miles from No. 15 to No. 5 black buoys, and from the latter buoy the north-western edge of the bank, which forms the south-east side of Pinnace channel, takes a general N.E. direction 2½ miles, and from thence the north-eastern edge curves nearly 4¾ miles south-eastward to No. 15 black perch buoy, where the bank terminates in a narrow point.

Between Nos. 7 and 9 black buoys an inlet, having from 3¼ to 4½ fathoms, trends one mile in a N.E. by E. direction, nearly dividing Middle ground into two banks. The general depth of water on Middle ground varies from 9 to 12 feet; but there are several ridges and knolls on it with only one and 3 feet water over them.

Pinnace Channel, which is only suitable for small vessels of light draught, is merely an inlet from the north-eastward, between Middle ground and Great sand, extending S.W. by S. 2½ miles, nearly to No. 5 black buoy, where the entrance to the channel in that direction is over a 12-feet ridge which connects Middle ground with Great sand. The channel is half a mile to a quarter of a mile wide, having 3¼ to 4 fathoms, in it.

Great Sand.—From No. 5 black buoy the eastern 3-fathoms edge of Great sand sweeps round N.N.E., North, and N.N.W. 5 miles to a narrow spit, forming the north-eastern point of the sand and the south-west point of the north-east entrance into Symonds channel. The southern 3-fathoms edge of Great sand extends from No. 5 black buoy nearly W. by N. ¼ N. 3½ miles to the south-west point, a quarter of a mile off which lies No. 1 black perch buoy. From the south-west point of Great sand its north-western 3-fathoms edge, which forms the south-eastern side of Symonds channel, trends N.E. by N. 5 miles, and from thence E. by N. three-quarters of a mile to the north-eastern point of the sand.

The main body of Great sand forms a flat 4½ miles long, N.E. by N. and S.W. by S., and extends from its north-western 3-fathoms edge 2¼ miles across towards Pinnace channel. The depth of water on this flat is very uniform, rarely being more than 5 feet, nor less than one foot.

Mud Isles, which are three in number, and on the centre of Great sand, are low and wooded, and are situated on a bank about one mile in extent, enclosing a small lagoon, having about 6 inches water in it. There is a narrow hollow one mile long, N.E. and S.W., with 8 to 20 feet water, close to the north-west side of the isles, and there are several knolls on the flat to the northward and southward of them.

Pope's Eye Shoal, which forms the north-west side of the south-west entrance of Symonds channel, is a bank of sand one mile long, N.E. by E. and S.W. by W., and about 2 cables broad, with 3 to 5 feet water on its shoalest part, which rises to a ridge 4 cables long, its centre bearing S. by E. ½ E. distant one mile from Swan-spit light-vessel. A detached narrow ridge trending N.N.E. and S.S.W. 2 cables, with 17 feet water on it, has formed at half a cable off the south-west point of Pope's Eye shoal.

The south-west extreme of the shallow water extending from Pope's Eye shoal is marked by a red buoy, moored in about 6 fathoms, and 2 cables to the southward of the 3-fathoms edge, with the high lighthouse on Shortland bluff bearing W. by N. ¾ N. distant 1¾ miles.

Clearing Mark.—To pass to the westward of the south-west extreme of Pope's Eye shoal, Swan-spit light vessel must not be brought to the northward of N. by E. ¾ E.*

West Middle Sand extends from Pope's Eye shoal about 5½ miles in a N.E. direction, between Symonds and Lœlia channels. The south-eastern 3-fathoms edge of the sand, which forms the north-west side of Symonds channel, trends from the south-west extremity of Pope's Eye shoal, N.E. ½ E. 1¾ miles, and N.N.E. 2 miles, whence it takes a N.E. by E. direction 2 miles, and after a turn of a quarter of a mile to the southward, the edge of the sand extends one mile eastward to its east extreme, on which is a bank with 5 and 6 feet water over it, its south-east point being marked by a black buoy with perch and ball, from which the high lighthouse on Shortland bluff bears nearly S.W. by W. ¼ W., and Arthur's Seat S.E. ½ E. At about half a mile to the westward of the buoy a spit, with 16 feet water on it, projects south-westward one-third of a mile from West Middle sand into the entrance of Symonds channel.

The north-western 3-fathoms edge of West Middle sand, which forms the south-eastern side of Lœlia channel, from the north-east end of Pope's Eye shoal, trends West half a mile, and then about N.E. by N. 1¼ miles, where it forms a spit, between which and the sand to the eastward of it—which for the distance of 2 miles is only a quarter of a mile across—an inlet, one quarter of a mile wide at its entrance, and having 4 and 5 fathoms water, runs in S. by W. three-quarters of a mile. From the bight of this inlet the north-western edge of West Middle sand extends N.N.E. 3 miles, when, after trending E. by N. half a mile, the edge of the bank resumes its N.N.E. direction one mile to its north extreme.

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* The light-vessel is only temporarily placed until the lighthouse is re-erected.

Between the north and east points of West Middle sand, which bear N.W. by W. ½ W. and S.E. by E. ½ E., distant a little more than 2 miles from each other, an inlet, having 2½ to 4½ fathoms, trends 2½ miles south-westward, nearly dividing the north-eastern portion of the sand into two separate banks. The south-eastern of these two banks rises to a narrow ridge, with only one to 3 feet water on it, extending from half a mile W.N.W. to nearly 2½ miles W.S.W. from the N.E. black buoy. There are two ridges, with 2 to 6 feet water over them, on the north-western of the two banks; and there is another ridge about one mile long, with one to 6 feet water over it, on the Middle of West Middle sand, at one mile to the south-westward of which there is a bank with 3 to 5 feet water over it.

SYMONDS CHANNEL is one mile wide at its south-western entrance, between No. 1 black perch buoy and Pope's Eye buoy, from whence the channel extends 6 miles in a north-easterly direction, and is two-thirds of a mile to one mile wide, until within 1½ miles of the N.E. black beacon buoy, where detached banks, with 16 and 17 feet water on them, so encumber the channel, that at half a mile south-westward of the buoy there is only a width of about 1½ cables, with 17 or 18 feet water.

There is a knoll with 16 feet water on it, on the south-east side of Symonds channel, at nearly 1½ miles from No. 1 black perch buoy, and another, having 17 feet water on it, nearly in mid-channel at about two miles south-westward of the N.E. black buoy; but, with these exceptions, there are generally 9 to 5½ fathoms from the south-west entrance to within 1½ miles of the buoy.

Symonds channel may be made available in northerly or north-west winds, when unable to fetch through West channel; but it is not recommended for any other than small vessels, until it is buoyed.

Royal George Sand, which forms the south-east side of the entrance of West channel, and lies midway between Pope's Eye shoal and the bank, extending from Shortland bluff to Swan-spit light-vessel, is one-third of a mile long, East and West, with 14 feet least water on it.

Each end of the sand is marked by a white buoy, moored in 16 feet water, which lie W. by N. and E. by S. 3 cables from each other. From No. 2, the western of the two buoys, and which is distinguished by a staff and ball, Queenscliff jetty lighthouse bears W. ½ S., and Swan-spit light-vessel N.E. by N.

The south-west entrance of West channel, between Royal George sand and the bank to the north-westward of it, is nearly one-quarter of a mile wide, with 5 to 4 fathoms water. The channel between the east extreme of Royal George sand and a 16 feet knoll lying at one cable West of the south-west spit of West Middle sand, is about the same width as the south-western entrance of West channel, with 26 and 27 feet water in the centre and eastern part.

Clearing Mark.—To clear Royal George sand on the western side, keep Swan-spit light-vessel to the eastward of N.E. ¼ N., until Queenscliff jetty lighthouse bears W. by S.

William Bank, which forms the north-western side of Lœlia channel, and the south-eastern side of West channel, is 4 miles long S.W. by S. and N.E. by N., and a quarter of a mile to half a mile broad within its 3-fathoms edges, its south-west extreme, which is marked by No. 6 white buoy, bearing N.E., distant nearly two-thirds of a mile from Swan-spit light-vessel. From a quarter of a mile within its south-west extreme to about three-quarters of a mile within its north-east spit, William bank rises to a narrow ridge, with one to 5 feet water over it.

Lœlia Channel extends from the south-western part of West channel 4 miles in a N.E. direction, between West Middle sand and William bank; its south-west entrance, is one cable wide, with 3¼ fathoms water; but from thence the channel increases to 3 and 4 cables in width, with 3½ to 5 fathoms, until within one-third of a mile of its north-east entrance, which is only one cable wide, with 3 fathoms water.

WEST CHANNEL, which is the one most used, extends from Royal George sand 5 miles in a N.N.E. direction, and is from one cable to half a mile wide, with 5 to nearly 3¼ and 5½ fathoms water, over a bottom of sand and shells. This channel is distinguished by Swan-spit light-vessel (to be removed when the lighthouse is replaced), in the south-west, and by West channel pile lighthouse, in the north-eastern entrance, the sides being marked by white buoys, with even numbers, on the south-eastern side, and black buoys, with odd numbers, on the north-western side.

The south-eastern side of West channel, after passing Royal George sand, is formed by the south-west extreme of West Middle sand and the north-western edge of William bank.

No. 4 white buoy is moored in 4 fathoms, at one cable to the northward of the south-west spit of West Middle sand, N.E., 1½ cables from a 16 feet knoll off the spit, and S.S.E. 5½ cables from Swan-spit light-vessel. No. 6 buoy marks the south-west spit of William bank, and bears N.E. ¼ E., distant two-thirds of a mile from Swan-spit light-vessel.

No. 8, 10, and 12 buoys are moored along the north-western 3-fathoms edge of William bank, in line with, and bearing N.N.E. from No. 6 buoy, from which they are distant, respectively, 4 cables, and 1½ and 2½ miles nearly. No. 10 buoy has two small 18 feet patches at S.W. by W. ½ W. half a cable, and W. by N. one cable respectively off it; and a shoal 2¼ cables in diameter with 17 and 18 feet water on it, the eastern or nearest part of which bears N.W., 1½ cables from the buoy. No. 12 buoy is surmounted by a staff and ball. A spit with 16 to 18 feet water on it extends from No. 12 buoy in a S.W. by S. direction a little more than half a mile encroaching for a cable into the channel beyond the line between Nos. 10 and 12 buoys. No. 14 buoy, which is also moored on the north-western 3-fathoms edge, and No. 16 on the north-east extreme of William bank, lie respectively N.E. ½ N. nearly one mile, and N.E. 1¼ miles from No. 12 buoy.

A narrow 18 feet shoal 1½ cables long N. by W. and S. by E., lies West 1½ cables off No. 14 buoy.

West channel is bounded on the north-west side by the bank which extends from Swan island, and is marked by No. 1 black buoy and Swan-spit light-vessel; and from thence by the irregular 3-fathoms edge of shoals extending 4½ miles in a N.N.E. direction.

Between Swan-spit light-vessel and No. 3 black buoy, which lies about N.N.E. 1½ miles from it, the 3-fathoms edge of the shoal is intersected by an inlet, having nearly 3½ to 4 fathoms water in it, at about a mile to the northward of Swan-spit light-vessel, trending nearly N. by W. ¾ W. three-quarters of a mile into Coles channel.*

From No. 3 black buoy, which is situated 2 cables within the 3-fathoms edge of the shoal, an indented spit projects 4 cables in a N.E. ½ E. direction. The south-east elbow of this spit approaches so near William bank as to contract this part of the channel to a width of 1½ cables, with barely 3½ fathoms water, and at the north-east elbow to only a cable's width, with 3½ fathoms in it.

From a small bight on the west side of this spit, the 3-fathoms edge of the shoal trends N. by W. half a mile to the entrance of a narrow inlet having 3½ to 3¾ fathoms water, extending N. ½ E. and S. ½ W. half a mile from its entrance. The entrance to this inlet is marked by No. 5 black buoy, from whence the 3-fathoms edge of the shoal extends N.N.E. ¾ E. 1½ miles to No. 7 black buoy, and then N.E. ½ N. a little more than three-quarters of a mile to the pile lighthouse near the north-east extreme of the shoals, and marks the north-western side of the north-entrance of West channel.

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* In the shoals of the West channel the changes which are most noticeable and important are those which have taken place near No. 3 black buoy, which lies N.N.E. 1½ miles from the Swan-spit lighthouse. Here there is a large accumulation of sand, which appears to be a constantly growing though shifting body, and is, probably the origin of all the shoals so frequently forming in the more southern portion of the channel.—*Staff-Commander H. J. Stanley, R.N.*, 1874.

The water shoals suddenly towards the north-western and south-eastern sides, throughout the greater part of the channel.

LIGHT.—A lighthouse has been erected on piles in 15 feet water, on the north-east side of West sand, West channel, from which is exhibited a *fixed white* light between the bearings of N.E. by N. (through west) and S. by E. ¼ E., and *fixed red* light in all other directions.

The light is elevated 31 feet above high water, and should be visible in clear weather from a distance of 11 miles.

Note.—The *red* light is cut to mark buoy No. 5 buoy of the West channel, and the black buoy off Prince George bank.

Vessels should pass half a cable eastward of the lighthouse.

There is a bank, with 18 feet water on it, 2 cables to the southward of the lighthouse.

West Bank.—The bank which forms the western side of West channel rises to several narrow ridges, with one to 5 feet water over them. West sand, the longest of these ridges, from nearly half a mile N.W. of No. 3 black buoy, extends N. ¾ E. 2 miles, and is from 100 to 400 yards broad, with a narrow spit returning three-quarters of a miles in a S. by E. direction from the northern end of the sand, and again bending to the N.N.E. for a mile. A narrow sand, half a mile long, nearly N.E. and S.W., lies between West sand and the north-east extreme of the bank on which this ridge is situated; the south-east edge of this ridge is about 100 yards within No. 7 black buoy.

From the northern end of West sand the bank, with 8 to 17 feet water over it, extends N. ½ E. one mile, to a sand-head, between which and that marked by West channel lighthouse, a bight one-third of a mile wide, with 4 to 3½ fathoms water, trends one-third of a mile south-westward into the bank.

Clearing Marks.—Station peak, 1,132 feet high, on the north-west side of port Phillip, in line with the north-east extreme of George point, bearing nearly N.W. by W. ½ W., clears the north-east extreme of all the entrance banks, at a distance of a mile from the most projecting point.

Coles Channel, between West channel and the western shore of port Phillip, is a 2-fathoms passage used by small vessels acquainted with the locality. It is bounded on the east side by West bank which forms the western side of West channel; the shoalest parts of the bank being West sand. This side of the channel is marked by two red buoys, the southern bearing North, distant nearly 2 miles from Swan-spit light-vessel, and the northern N. by E. 1⅔ miles from the southern buoy.

The western side of Coles channel is formed by the shoal extending northward from the east end of Swan island and along the western shore, noticed at page 314. The channel is a quarter of a mile to half a mile wide, with 2½ to 3½ fathoms in its northern and southern entrances, but only 2 to 3 fathoms in its central and widest part; the water shoals suddenly towards West sand, but gradually towards the shore.

EAST SHORE.—Arthur's Seat, E. by S. nearly 14 miles from Shortland bluff, so called from its supposed resemblance to the hill of that name near Edinburgh; it is a conspicuous bluff 975 feet high, sloping down to the S.E., and is visible nearly 40 miles at sea. From the southward its north-west extreme appears precipitous, and being the highest land on the coast, is a remarkable object by which to distinguish the entrance to port Phillip.

LIGHT.—Immediately under Arthur's Seat is a *fixed* light, showing *red* between the bearings S. by W. ½ W. and S.E. ½ E.; and *white* between S.E. ½ E. and E. by N. ½ N., elevated 80 feet above high water, and in clear weather the *white* light should be seen from a distance of 14 miles.

From the same tower a second light is shown. The light is a *fixed* white light, placed 40 feet below the *red* light, and only visible between the same bearings as the red light, viz., from S. by W. ½ W. to S.E. ½ E.; it should be seen in clear weather from a distance of from 8 to 10 miles.

Note.—Vessels outward bound by the South channel, will now make the light under Arthur's Seat more readily. The Middle ground will be avoided by keeping this white light and the red light in sight.

Water.—The land between Arthur's Seat and Martha point is low, with good spring-water near the shore, North of Arthur's Seat.

Dromana Bay.—From the foot of Arthur's Seat the shore curves N.E., North, and N.W. 4 miles to Martha point; the north-eastern part of this bight forms Dromana bay, where there are 3 fathoms water at a quarter of a mile from the shore.

Dromana is a small town, with a population of 150 persons. There is a telegraph office here, and daily communication by coach and steam-vessel with Melbourne. The jetty is 1,400 feet long.

LIGHT.—A *fixed green* light visible for a distance of 4 miles is exhibited from Dromana jetty end.

From Martha point, the shore, which may be approached to a quarter of a mile in 3 fathoms, trends nearly N.N.E. 2 miles to Martha cliff, which forms the south-west point of Balcolms bay. The land between the point and cliff rises to a ridge, of which the south-west and highest part is mount Martha, a hill 527 feet high, bearing N.N.E. ½ E., distant 4½ miles from Arthur's Seat.

Balcolms Bay extends from Martha cliff N. by E. ½ E. nearly 3 miles to Fisherman point, and is two-thirds of a mile deep; except within half a mile of Martha cliff the shore may be approached to a quarter of a mile in 3 fathoms, but there are some rocks close along shore, of which Shag rock lies 1¾ miles north-eastward of Martha cliff; at three-quarters of a mile north-eastward of the cliff is Balcolms creek.

Fisherman Bay and Mornington.—Fisherman bay, which is the water frontage of Mornington, is merely a slight indentation of the coast extending from Fisherman point N. by E. nearly one mile to Snapper point. Shoals project a quarter of a mile from the southern quarter of the bay, but the shore to the northward of these shoals may be approached to a cable in 3 fathoms.

Snapper Point.—The point projects a quarter of a mile from the line of coast, and has a small jetty for the convenience of coasters.

LIGHTS.—On Snapper point, a *fixed* light is exhibited at an elevation of 50 feet above the level of the sea, and is visible at a distance of 10 miles. The lighthouse is built of wood and painted white.

At the end of the jetty is a mast with a lamp 30 feet high, showing a small *fixed red* light visible at a distance of 3 miles.

Mount Eliza.*—From Snapper point the coast trends N.E. by N. 4 miles to Davy point; it is slightly embayed, and is intersected by four small creeks, flowing north-westward from the hills at the back; the most conspicuous of these hills is mount Eliza, 527 feet high, which bears N.N.E. ¾ E., distant 11½ miles from Arthur's Seat. This coast may be approached within a quarter of a mile in 3 fathoms; but the shore is rocky for about 1½ miles southward from Davy point.

The coast from Davy point, after receding nearly half a mile to the eastward, extends N.E. ½ N. 1½ miles to the village of Frankston. The country behind is hilly, and is intersected by two or three small creeks.

The south-eastern shore of port Phillip, which is mostly wooded, has several townships, and numerous houses and other buildings are scattered along it.

Between Davy point and Frankston a shoal, with 3 to 17 feet water on it, extends one-third of a mile from the shore; and at a little more than half a mile N. by E. from the point a spit projects north-westward a quarter of a mile further from the shoal to a rock with only 4½ feet water on it.

Frankston, a township 27 miles South of Melbourne. It has a jetty, extending a quarter of a mile into the bay, and is the centre of a large fishing and firewood trade. The population in the township numbered 200 in 1881, but the chief part is scattered in the suburbs. It is connected with Melbourne by rail, and is a telegraph station.

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* *See* Admiralty chart of port Phillip, Northern Sheet, No. 1,171 b; scale, *m* = 1 inch.

Garrum Swamp.—From Frankston a low uniform shore curves in a N. by W. ¾ W. direction 8½ miles to the point of Mordialloc, and is separated by a narrow piece of wooded land from Garrum swamp, at the back of this coast. The shore from Frankston to the point of Mordialloc may be approached to the distance of three cables in 3 fathoms; but a ledge of rocks projects a quarter of a mile southward from the point.

From Mordialloc to Ricket point, W. by N. 2¾ miles from it, the coast forms a bay 2½ miles across and three-quarters of a mile deep. From 4 and 4½ fathoms in the entrance of this bay the water shoals to 3 fathoms at a quarter of a mile from the shore. Three patches, on the central and smallest of which there are only 6 feet water, lie W. by N. two-thirds of a mile, one mile, and 1½ miles from the eastern point of the bay.

Mordialloc is a township on the river Plenty 15½ miles from Melboune, with a population in 1881 of about 350 persons. There is a pier which affords facilities for landing, and steamers ply to Melbourne, with which place it is also connected by rail and telegraph.

Ricket Point.—From between Ricket point and the western point of the bay, just noticed, foul ground and shoal water project southward to 3 fathoms at half a mile from the shore.

Picnic Point.—From Ricket point a mostly rocky coast extends N.W., ¾ N. 3¼ miles to Picnic point. There are two intermediate projections, one at a mile and the other at nearly 2 miles from Ricket point. Close to the southward of the former projection is Quiet Corner; and between the latter and Red cliff, one-third of a mile to the northward of it, is Half-moon bay. The coast between Ricket and Picnic points is bordered by foul ground and sunken patches, some with only 4 and 5 feet water on them, extending nearly half a mile from the shore. A spit projects S.W. from Picnic point to 3 fathoms at half a mile off.

From Picnic point to Green point, N.N.W. ¾ W. 1⅓ miles from it, the coast forms a slight indentation, bordered by a shoal, of which the 3-fathoms edge extends from half a mile off Picnic point to 400 yards close to the southward of Green point.

Anonyma Shoal is a rocky patch one-third of a mile long, N.W. and S.E., and 300 yards broad, with one foot water on its shoalest part; there are 4 fathoms at a cable from its outer edge, and 3¼ fathoms between it and a quarter of a mile off the beach.

Beacon.—There is a chequered beacon on this shoal, bearing S. by W. nearly three-quarters of a mile from Picnic point, and two-thirds of a mile from the shore.

A Rocky Patch, with 3½ fathoms water over it, lies nearly West 1¼ miles from Picnic point; there are 5 and 4½ fathoms between this patch and the shore.

Green Point.—Shoal water extends W.S.W. to 3 fathoms at half a mile from the point.

From Green point the coast extends N. by W. ¼ W. 1¼ miles to Cole point, and from thence curves in a N.N.W. ¼ W. direction 1¼ miles to Ormond point, the eastern point of Hobson bay. For about one mile North from Green point the coast is bordered with rocks, and from half a mile off the point, the 3-fathoms edge of the shoal water fronting the shore trends irregularly to one-third of a mile off Cole point, and then about N.W. ½ N. to three-quarters of a mile off Ormond point.

Brighton.—The southern and greater portion of the coast from about Green point to Ormond point forms the water frontage of the town of Brighton, a watering place, and may be considered a suburb of Melbourne, from which place it is distant 8 miles. It is a favourite residence for the citizens, and abounds with handsome villas. There are two fine piers and a long sandy beach. Market-gardening is the chief industry of the district. Trains run hourly to Melbourne, and it is a telegraph station. The population in 1881 was 4,755, and of the district 7,602.

HOBSON BAY,[*] the port of Melbourne, consists of all inlets, rivers, bays, &c., within a line drawn from Ormond point, West to Gellibrand point, and is 2 miles deep; but the western portion only is available for shipping, nearly all the eastern half of the bay being occupied by a shallow bank.

From Ormond point the low eastern shore of Hobson bay trends N. by W. ½ W. a little more than a mile to a jetty at the west point of the town of St. Kilda: the jetty projects from the shore 160 yards into 6 feet water. The 6-feet edge of the shoal which borders the shore extends from a little more than a cable off Ormond point to about 30 yards within the outer end of the jetty. For about one-third of a mile northward from Ormond point there are numerous rocks scattered over the shoal.

The north-eastern shore of Hobson bay from about a quarter of a mile northward of the jetty of St. Kilda extends in a straight line N.W. by W. ¾ W. 2 miles to Sandridge pier. There are 9 feet water within a cable of the shore from the jetty to the pier.

The northern shore of Hobson bay from the Melbourne and Hobson bay Railway pier, trends W. by S. 1¼ miles to the northern side of the entrance of Yarra river. The 6-feet edge of the shoal which borders the shore, extends from it 100 yards at the Railway pier to 300 yards from the northern side of the entrance of the river.

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[*] *See* Admiralty plan of Hobson bay and Yarra river, leading to Melbourne, No. 624; scale, $m = 6$ inches.

St. Kilda, about 3½ miles South of Melbourne is a watering place, with an esplanade along the sea beach. Several tracts of water are fenced in for bathing purposes; the fencing is for protection against sharks. Trains and omnibuses are constantly running to and fro Melbourne. It is also a telegraph station. The population in 1881, was 11,662.

LIGHT.—On the outer extremity of the mole at St. Kilda. The light is a *fixed green* light, elevated 19 feet above the sea, and should be visible in clear weather from a distance of 2 miles.

Sandridge Pier.—The pier projects from the south end of Sandridge, nearly S.W. by S. 530 yards, into 19 feet water. Four red buoys are moored in line along the south-east side, and three on the north-west side of the pier, from which the former are distant about 100 yards and the latter 70 yards.

Railway Pier.—At W. by N. ½ N. 600 yards from Sandridge pier, the Melbourne and Hobson bay Railway pier extends from the shore S. by W. ½ W. 730 yards, into 20 feet water. There is a black buoy on either side of the pier, at about midway between its extremity and the shore; that on the south-east side, in 19 feet water, being 70 yards, and the other, on a 16-feet spit projecting from the shore, being 170 yards from the pier.

LIGHTS.—At the outer end of Sandridge pier is a *fixed red* light, visible at the distance of 2 miles.

At the outer extremity of the Railway pier is a *fixed green* light, visible at the distance of 2 miles.

From the distance of 70 yards within the outer end of Sandridge pier the 3-fathoms edge of the bank between the two piers extends to nearly 2 cables off the inner end of the Railway pier; there being 20 to 19 feet water along the south-east side of this pier for a distance of 430 yards from its outer extremity. Vessels of large tonnage can lie alongside the piers and be rapidly loaded or discharged, there being numerous steam cranes for that purpose.

SANDRIDGE, the port of Melbourne, is almost entirely dependent on shipping. The population in 1881 was 8,771.

The Melbourne and Hobson bay Railway runs N.E. 2 miles from the pier to the locality of the Custom House at Melbourne.

Soundings and Buoys.—From about one mile westward of Ormond point the 3-fathoms edge of the bank which fills the eastern half of Hobson bay extends N.W. ½ W. 1½ miles to its western elbow, which is marked by a white buoy, having a staff and ball. At N.E. by N. 3 cables from this is another white buoy close to the edge of the bank, with a 10-feet knoll at one cable to the southward of it. From the northern buoy the 3-fathoms edge of the bank trends N.N.E. ½ E. nearly half a mile, and then nearly N.W. by N. one-third of a mile to about 130 yards within the end of Sandridge pier. Nearly half a mile S. by W. from the end of Sandridge pier is a red swinging buoy in 25 feet; and there are two red buoys in 12 feet, half a mile from the shore, between Sandridge and St. Kilda.

The depth of water on this bank gradually decreases from 18 feet at its edge to 10 and 12 feet at a quarter of a mile from the shore, over an even bottom of sand and shells.

GELLIBRAND POINT.—From the southern extreme of Gellibrand point a low rocky shore trends N.E. nearly two-thirds of a mile to the east extreme of the point, on which stands the old lighthouse, and is bordered by ledges of rocks, with spits of foul ground, which, midway, extend a quarter of a mile from the shore towards the light-vessel. These spits are enclosed by a shoal bank, the 3-fathoms edge of which, from 2 cables south-eastward of the south extreme of Gellibrand point trends E. by S. 2 cables, and N.E. by E. a quarter of a mile, to the south-east elbow of the bank, and from thence extends North two-thirds of a mile to 2 cables N.N.E. of the east extreme of Gellibrand point.

LIGHTS.—Gellibrand point light-vessel is moored in 5 fathoms water, at S.S.E. one cable from the south-east elbow of the bank which projects from the point, with the south extreme of the point bearing W. by N. ¼ N., and the old lighthouse on the east extreme of the point, bearing N. by W. ¼ W. The vessel, which is painted red, has one mast and ball, and exhibits a white light 40 feet high, which *flashes every half minute*, and is visible at the distance of 10 miles. A gong is sounded alternately with a horn *every ten minutes* in foggy weather.

At Williamstown, on end of the breakwater is shown a *fixed red* light, visible for a distance of 3 miles.

WILLIAMSTOWN, on the south-west side of Hobson bay and 8 miles from Melbourne had in 1881 a population of 9,034 persons; their business is principally with shipping. There is accommodation alongside the piers for vessels of various burthen; there is also provision for the repairs of vessels.

Breakwater.—From the east extreme of Gellibrand point a breakwater extends N.E. ¼ E. nearly 500 yards. From about 22 feet at its outer end, the depth of water on the north-west side decreases to 15 feet at 300 yards farther in towards the shore.

Railway Pier.—From about 40 or 50 yards to the north-westward of the old lighthouse on the east extreme of Gellibrand point, the Railway pier extends N. by E. ½ E. about 600 yards into 25 feet water. Four red buoys are moored along the south-east side of the pier, from which they are distant about 50 yards; there are 18 feet water between the two inner, and 20 feet between the two outer buoys.

Ann's Wharf, 2½ cables westward of the railway pier, projects from the shore N. by E. about 370 yards, into 9 feet water. From about 400 feet within the end of this wharf, the dockyard wharf extends to the inner part of the patent slip jetties, and encloses the dockyard reserve.

Old Jetty.—From the inner (Wright's) patent slip, the shore continues westward a little more than one cable, to the old jetty, which projects N. by E. 180 yards from the shore, into 4 or 5 feet water. At nearly midway between the inner patent slip and the old jetty a smaller jetty extends out about 120 yards from the shore.

DOCKS and SLIPS.—The Alfred graving dock, which was opened in 1874, is about 100 yards westward of the railway pier; its dimensions are:—Length over all 470 feet; length of floor 450 feet; available length on floor to side of caisson 459 feet; breadth of entrance 80 feet, depth over sill, at low water ordinary springs, 25 feet,* at ordinary high water 27 feet. Immediately westward of the Alfred dock are the two entrance jetties of the Government patent slip, which has a cradle 203 feet long, and can receive vessels of 2,000 tons weight, with a draught of 25 feet. Between Ann's wharf and the old jetty is Wrights patent slip for vessels of 500 tons register; also two docks one 330 feet long, 46 feet broad at the gates, and a depth of 17 feet water on the sill; the other, 240 feet long, 33 feet broad at the gates, and 13 feet on the sill. On the south bank of Yarra river is Duke's dock, 620 feet long, 55 feet wide at top, and an average of 15 feet water on sill; and Duke's slip for small craft of 50 tons, drawing under 9 feet. There is also a floating dock 154 feet long, with a breadth of entrance of 30 feet, capable of lifting ships of 700 tons register, and not drawing more than 12 feet.

Railways.—Within the Railway pier is the southern terminus of the railway which curves westward and north-westward 2½ miles to Geelong junction, passing through Williamstown and along behind North Williamstown. From Geelong junction the Geelong and Ballarat railway branches to the westward; and the Williamstown and Melbourne railway, 5½ miles to the northward, eastward, and south-eastward, forming nearly a semicircle to Melbourne, which is distant by rail about 8 nautical miles from Williamstown Railway pier.

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* Remark Book, Staff Commander J.R. Osborn, H.M.S. *Nelson*. In November 1882, H.M.S. *Nelson* 6,670 tons, drawing 25 feet 8 inches was berthed alongside the Railway pier at Williamstown, and afterwards taken into the Alfred graving dock, without touching anywhere, drawing at the time 24 feet 6 inches, and when undocked 25 feet. On the sill of the dock there was 26 feet 8 inches water, a depth of 25 feet 8 inches being required to clear the bilge keels of the sill.

The West Shore.—From about 100 yards westward of the old jetty the shore trends nearly N.N.W. 6 cables, to a small jetty projecting eastward about 100 yards from the shore, which here forms the southern side of the mouth of Yarra river. The shore from the old jetty to about half a mile north-westward of the southern entrance point of the river forms the water frontage of North Williamstown. Between the old jetty and a smaller one, at about one-third of a mile to the north-westward of it, are several others, of which the longest does not appear to extend into more than 4 or 5 feet water.

For about 1¼ cables westward of Ann's wharf a depth of 6 feet will be found at 200 yards from the shore, the one fathom line then turns to the north-eastward and northward towards the entrance of Yarra river, at a distance of 3 cables from the shore. Two beacons stand in 4 feet water, about 400 feet S.E. and N.W. from each other, with the outer end of Ann's wharf bearing S.E. nearly, distant 3 and 4 cables.

The north-western bight of Hobson bay is occupied by a bank extending across the entrance of Yarra river, probably caused by the deposit from the river. The 3-fathoms edge of this bank, from about one cable North of the Williamstown Railway pier, extends N. by E. and North nearly one mile, and then curves inwards towards the middle of the Sandridge railway pier. A black perch buoy, in 17 feet, bears W. by S., distant 5½ cables length from the outer end of the Melbourne and Hobson bay Railway pier.

There are four red buoys and one white buoy, moored in 16 and 17 feet water close round the black perch buoy, and a red buoy in 15 feet N. by W., 2 cables from the perch.

A black cone-shaped buoy, surmounted by a staff and ball, is moored on the bank in 9 feet water, with the outer end of the Williamstown Railway pier bearing S.E. ¾ S., distant 6 cables. At N. ¼ E. a quarter of a mile from this, is a white buoy moored in 11 feet water.

TIDES.—It is high water, full and change, in Hobson bay, at 2h. 31m.; springs rise 2 ft. 8 in.; neaps, 2 ft. 2 in.; neaps range, 1 ft. 10 in.

LIGHTS.—On Williamstown beach at the south side of entrance to Yarra river, a *fixed white* light is exhibited, but up the first reach of the river it shows a *red* ray.

From the outer black dolphin, at the entrance of the river, a *fixed red* light is shown.

From the Elbow beacon in the river a *fixed green* light is exhibited.

Anchorage.—Between the banks which extend from the eastern and western shores of Hobson bay, there is a space of nearly 2 square miles, capable of affording shelter to upwards of 500 sail, in 3 to 5 fathoms water, with good holding ground of mud. The bay is open to southerly gales, which send in sufficient sea to interrupt traffic; but small vessels can at all times find shelter off Williamstown.

The Torpedo ground lies southward of Williamstown breakwater pier, between lines drawn from Gellibrand light-vessel to the outer extremity of that breakwater pier, and from the light-vessel to Gellibrand old lighthouse. Mariners are cautioned not to anchor in the vicinity.

Buoys marking the battery practice range at Williamstown have been placed in an east and west direction, 3 cables apart; the eastern buoy is moored 2 cables from the shore. Vessels are cautioned not to come within these 3 red buoys whilst firing is going on.

YARRA RIVER is a narrow winding stream, in which, by dredging, and making an embankment for three-quarters of a mile from the mouth of the river upwards, a depth of 13 feet in the channel is maintained to Melbourne, vessels drawing 15 feet can get to the wharves. Although the mouth of the river is three-quarters of a mile wide, from N. ¾ E. to S. ¾ W., the shallow flat projecting half a mile from the northern side, and the shoal water extending from the southern side of the mouth of the river, rendered it necessary to cut an entrance channel into the river, 60 yards wide. The black cone-shaped buoy, with the staff and ball, last noticed, kept in line with the two black dolphins, bearing W. by N. ½ N. show the south side of the channel; the northern side being marked by red dolphins.

From the outer black dolphin Yarra river trends with a slight southerly curve between the flats, N.W. about half a mile, to abreast of Greenwich pier, which projects from the west bank of the river, 240 yards eastward. The course of the river from Greenwich pier is N. by W. one mile, to a bight on the west side, forming the entrance to Stony creek. The river next trends N.E. half a mile, and then N. by W. nearly one mile to where it is joined by Saltwater river from the northward.

The channel of Yarra river, from its entrance to its junction with Saltwater river is 160 to 60 yards wide. The banks of the channel are marked on the eastern side by red, and on the western side by black dolphins or beacons. Yarra river, from its junction with Saltwater river, trends 3 miles in an E. ½ S. direction to Melbourne quay, near the bridge and Custom House, and is 50 to 90 yards wide, with 13 to 21 feet water. This part of the river winds between its steep banks, like a canal through the flat land, with no shoals on either side.

Directions.—Before entering Yarra river open the *green* light a little North of the *red* one, and when nearing the *green* light, port and ring it and the shore *red* light in line, which marks lead past the Shellbank lphin.

If bound out.—When passing the Shellbank dolphin bring the *green* and shore *red* lights in line, until close to the former, when starboard, and haul gradually out towards the dolphin *red* light.

Buoys with 10 fathoms of 1¼-inch chain attached, have been secured round the upper red dolphin at Raleigh bar and the black dolphin at Fishermen bend, for affording facilities for navigating Yarra river.

TIDES.—It is high water, full and change, in Yarra river, at Melbourne quay, at 2h. 48m.; springs rise 2 ft. 8 in., neaps 2 ft. The velocity of the stream of Yarra river depends on the rains that have fallen; but it generally runs down. Floods are not unfrequent, overflowing banks and causing great destruction of property: that of December 1863 rose 7 feet above the mean level of the river, below the falls. Above these falls the rise was stated on that occasion to have been 30 feet, and in the gorges above Melbourne 50 feet.

For guidance while navigating Yarra river, a tide gauge has been placed at the outer black dolphin at the entrance of the river.

The North-western Shore of port Phillip, from the south extreme of Gellibrand point extends irregularly, W. by N. 1¼ miles, to a low rocky point, and thence N.W. ½ W. two-thirds of a mile to the entrance of Kororoit creek which trends to the westward. The 3-fathoms edge of the foul rocky ground which borders the shore, projects 600 yards except about midway between the two points, where there are 3 fathoms at 300 yards from the shore. A small rocky patch, at the extremity of a spit projecting 400 yards from the shore, lies E. by S. ½ S. 4½ cables from the low rocky point.

From Kororoit creek the shore trends S.W. by W. 1¾ miles to the point of Altona, and is also bordered by a rocky bank, extending 1¼ miles S.E. off Altona point, with 7 to 18 feet water and shoal patches upon it. From the south point of this bank the south extreme of Gellibrand point bears N.E. by E. ½ E. distant 2 miles. Two bights, having 8½ and 3½ fathoms water, run half a mile into this bank from the south-eastward. The north-eastern bight, which is close to the low rocky point before noticed, approaches the mouth of Kororoit creek to one-third of a mile, with 3 fathoms water.

From the point of Altona a low shore, with several small lagoons close behind it, forms a shoal bay, barely one mile deep, extending S.S.W. 4 miles to Cook point. At midway between the two points is the mouth of Skeleton creek, which winds through the low swampy ground from the north-westward. The 3-fathoms edge of the shoal, which fills this bay, extends beyond the line of the two points, and forms, midway, a spit projecting southward to N.E. ½ N. 1¾ miles from Cook point.

Cook point is low and rocky, with a spit, extending one mile to the eastward, having 10 feet water at its extremity, at half-way between which and the shore there is a rocky patch with 3 and 4 feet water on it.

A black buoy is moored in 4¾ fathoms water, at a quarter of a mile off the spit, with Cook point bearing West, distant 1¼ miles.

A dynamite hulk is moored in 20 feet water with the buoy bearing S. by E. ½ E. about 7 cables distant.

From Cook point a low continuation of the north-western shore of port Phillip trends S.W. ¼ W., 6 miles to Werribee river. At 2 miles to the south-westward of Cook point there is a low projection, from whence rocky shoals, with 3 and 4 feet water on them, project half a mile. The 3-fathoms edge of the shoal water, which borders the shore, extends from one-third of a mile off Cook point to about the same distance off the rocky shoals just mentioned. From thence to Werribee river the 3-fathoms edge of the shoal water generally extends a little more than a mile from the shore; and from the mouth of the river, a spit with 16 feet water on its extremity, projects 1½ miles to the south-eastward.

Werribee River has a 3-feet bar across its entrance, within which the first reach trends westward about one mile. It is about one cable wide, with one to 2 fathoms water. Above this reach the river is merely a small stream, flowing in a winding direction from about N.N.W.

The WESTERN ARM of this estuary forms the approach to Geelong.

The Southern Shore of the Western arm of port Phillip, after a slight curve for a little more than three-quarters of a mile in a N.W. by W. direction from George point, extends W. by N. 1½ miles, and from thence, with a slight bend to the southward, nearly West 1⅔ miles to Richards point. From about the middle of this bend, at a mile eastward from Richards point, Portarlington jetty projects from the shore to the edge of the one fathom line. For the first 2 miles from George point, shoal spits and detached patches with 2 to 6 feet water on them, project upwards of one-third of a mile to a quarter of a mile from the shore. From one mile N.W. of George point to half a mile eastward of Richards point the 3 fathoms edge of a continuation of Prince George bank extends one-third of a mile to a quarter of a mile from the shore; but from Richards point it projects N.W. by N. half a mile to a spit with 10 feet water on it, at a quarter of a mile to the northward of which is a black buoy, moored in 4½ fathoms, with Richards point, bearing S.S.E., distant three-quarters of a mile.

From Richards point the shore trends S.W. 4¾ miles to Ballarine jetty, which projects about 100 yards from the land. For the first 1½ miles south-westward of Richards point a bank, with 3 to 4 feet water on it, extends nearly two-thirds of a mile from the shore. From the outer edge of this bank, close to which there are 3 and 4 fathoms water, the 3 fathoms edge of the shoal water bordering the shore trends south-westward to two-thirds of a mile off the jetty. Three or four detached patches, with 3 to 6 feet water on them, lie between 1½ and 2¼ miles south-westward of Richards point. There are only 6 feet water at about one cable off the jetty, and between half a mile and 1¾ miles to the north-eastward of it, spits with 3 to 4½ feet water on them, project about one-third of a mile from the shore.

The south shore from Ballarine jetty trends W. by S. ½ S. 2½ miles to a jetty off a slight projection of the land forming the south point of the south-east entrance of the Ship channel, through the Outer harbour of Geelong; some rocks lie close to the shore on either side of the jetty, and between one and two-thirds of a mile to the westward of it. The 3-fathoms edge of the shoal water fronting the shore extends from half a mile off the jetty to 800 yards off the south entrance point of the Ship channel.*

Portarlington is a small township 63 miles in a southerly direction from Melbourne by land, and 23 miles across the bay. It is a watering place, and a telegraph station. The population in 1881 was about 400. The district is an agricultural one.

LIGHTS.—From Portarlington is exhibited a *fixed red* light, visible between the bearings of W.S.W. and S.E. by E., and in clear weather should be seen from a distance of 7 miles. The former bearing leads clear of Prince George bank, and the latter bearing leads clear of the shoal water off Richards point.

A *fixed green* light is exhibited on Portarlington jetty, at an elevation of 22 feet above high water, visible from any direction seaward, for a distance of 5 miles in clear weather.

The South-east Entrance of the Ship Channel into, and through the Outer harbour of Geelong, lies between the slight projection of the land on the south side, and Wilson spit, the extremity of a bank extending from the north shore to 18 feet water, at 1¼ miles from the south shore. A white perch buoy is moored in 5 fathoms, at South a quarter of a mile from the spit, and N. by W. a little more than one mile from the south entrance point. Two black buoys are moored on the southern side of the entrance, one in 4 fathoms, bearing S.E., distant half a mile, and the other in 3½ fathoms, bearing S.W., distant nearly one mile from the white perch buoy.

The channel through this entrance is upwards of three-quarters of a mile wide, with 3½ to 5 fathoms, the deepest water being between the white perch buoy and the black buoy to the south-eastward of it; but a bank with 19 to 23 feet water over it, lies between a quarter of a mile and two-thirds of a mile to the south-westward of the white perch buoy. A chequered buoy a quarter of a mile W.S.W. of the white perch buoy marks the north-eastern and shoalest part of the bank.

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[*] *See* Admiralty plan of Geelong harbour, No. 2,731; scale, m = 3 inches.

The shore from the south entrance point of the Ship channel forms a bay extending N.W. by W. ¾ W. 4 miles to Henry point. It is barely one mile deep, and is mostly occupied by a bank, the 3-fathoms edge of which projects from 4 cables off the south entrance point to three-quarters of a mile eastward of Henry point, where a spit, with 16 feet water on it, extends a quarter of a mile northward from the edge of the bank.

Aspect.—The land between Richards and Henry points is mostly low, the hills scattered over it rarely exceeding 120 feet in height, except the summit of Ballarine, S. by W. 2⅔ miles from Richards point, which attains an elevation of 447 feet. Much of this land is under cultivation, and has several villages and country residences of the merchants and other inhabitants of Geelong.

Henry Point is low, the Bluff, which is its most elevated part, being only 25 feet above the mean level of low water springs. A jetty projects about 150 yards from the east side of the point into 3 feet water.

Anchorage.—There is good anchorage in 4 to 5 fathoms, mud, between one and 1½ miles eastward of Henry point.

The Northern Shore of the western arm of port Phillip from Werribee river trends S.W. ½ S. 2¾ miles, and from thence W. by S. 2¼ miles to a low point, on the east side of which is a small stream flowing from the northward, and on the west side of the point is the mouth of Little river, which winds through the lowland from the W.N.W. From the projection of the land midway between Werribee and Little rivers, a spit with 4½ feet water on its extremity, projects one mile to the southward, having a black buoy moored in 15 feet water, at half a mile to the southward of the spit.

Beacon Point.—From Little river the shore extends S.S.W. ½ W. 1¼ miles to Beacon point, from which a shoal spit projects two-thirds of a mile towards a beacon bearing S.E. by E. ½ E., distant one mile from the point. There are two patches between the beacon and the spit; on the outer one there is one foot water, and the inner one is awash. From Werribee river to the point half-way between the river and Beacon point the 3-fathoms edge of shoal water projects irregularly half a mile to 1½ miles; and from the half-way point to the beacon, it extends 2¼ miles from the shore, the edge of the bank closing to within a quarter of a mile of the beacon.

Kirk Point.—From Beacon point the shore extends S.S.W. ¾ W. 1⅓ miles to Kirk point, and is also fronted by a bank, of which the 3-fathoms edge projects from half a mile southward of the beacon to about the same distance from Kirk point.

From Kirk point the low shore trends W.S.W. 2 miles, and from thence South 2¾ miles to Wilson point, forming a bay, of which the bight for a distance of 1½ miles is filled by a mud-flat. For about a mile south-westward from Kirk point rocky spits project from 200 yards to a quarter of a mile off the shore.

From half a mile off Kirk point the 3-fathoms edge of an extensive bank, with some shallow patches on it, curves in a S.S.W. and S.S.E. direction to a spit with 9 feet water on it, marked by a striped black and red buoy. moored in 3 or 4 fathoms water, from which Wilson point bears S.W. by W. ½ W., nearly 2½ miles. From the extremity of this spit, the 3-fathoms edge of the bank, after turning two-thirds of a mile to the north-westward, extends S.S.W. 2¾ miles to another spit, having 15 feet water on it, and marked by a red perch buoy, moored on the bank in 14 feet water, at S.S.E. one mile, from Wilson point; some banks with 15 to 17 feet water on them lie within half a mile eastward and southward of the buoy.

Wilson Spit.—From between one-third and two-thirds of a mile westward of the red perch buoy, a continuation of the bank which extends from Wilson point, trends S.S.E. and S. by W. ½ W. 2 miles to Wilson spit, which forms the north side of the south-east entrance of the Ship channel into, and through the Outer harbour of Geelong. This projecting bank, which has 13 to 17 feet water on it, is only 200 to 600 yards broad, the narrowest part being midway between the red perch buoy and the spit.

Wilson Point is low, with a small islet close off it, and numerous rocks extending about 200 yards to the southward. Two detached patches, having 5 and 6 feet water on them, lie respectively E.S.E. one-third of a mile, and S.E. ½ S. half a mile from Wilson point.

From Wilson point the shore extends in a N.W. by W. ¾ W. direction 1½ miles to the central and longest of some jetties, projecting into 2 or 3 feet water; and from thence nearly half a mile westward to a low point, close off which lies Snake island, The shore is bordered by mud and sand, with numerous rocks, which for upwards of three-quarters of a mile westward from Wilson point extend from more than a half to a quarter of a mile from the land.

Snake Island extends from 100 yards to 900 yards from the mainland, with which it is connected by a flat, terminating to the southward in a rocky spit, projecting 2 cables southward from the island.

From the low point immediately behind Snake island the shore curves in a W.S.W. and southerly direction one mile to a double point, having a ledge of rocks projecting about one cable to the southward between which and Snake island is a clear space of nearly one-third of a mile, with 9 to 13 feet water.

From two-thirds of a mile westward of the red perch buoy off Wilson point, the 3-fathoms edge of the bank fronting the shore trends N.W. by W. to a 17-feet spit, at S.W. a little more than one mile from Wilson point. From this spit the 3-fathoms edge of the bank extends irregularly, in a W. by N. ½ N. direction 2 miles, to within half a cable of the ledge of rocks projecting from the double point already noticed. There are patches, with 3 and 4 feet water over them, between the edge of the bank and the rocks extending southward from Snake island.

Lillias Point.—From between a quarter of a mile and half a mile westward of the double point just noticed a tongue of land, not more than 2 to 3 cables broad, projects S.S.W. two-thirds of a mile from the line of coast to Lillias point, a double projection, bearing N. by E. ½ E., distant nearly 2½ miles from the bluff on Henry point.

Bird Rock.—From the western projection of Lillias point a narrow rocky ledge extends nearly S.S.W. one-third of a mile to Bird rock, on which is a beacon. This rock, and the ledge connecting it with Lillias point, are enclosed by a rocky shoal, with 2 to 5 feet water on it, extending one cable from the east side of the ledge, and S.W. 2 cables from the beacon to a white perch buoy, moored near the edge of the spit.

The 3-fathoms edge of the shoal bordering the shore from one cable southward of the double rocky point, west of Snake island, trends S.S.W. to 4 cables eastward of Bird rock, and then curves round in a S.E. by E. direction to the east point of a bank, which projects S.E. one mile from the rocky ledge between Lillias point and Bird rock. At half way out, this bank is only 2 cables broad; but from its east point the south-eastern edge extends S.W. ½ W. half a mile to the Outer Artificial cut, that forms a ship channel through the narrowest part of the bank. From this cut the bank, here only one cable broad, stretches S. by W. three-quarters of a mile to within a cable of the spit, which projects northward from the bank on the east side of Henry point. There are 15 to 17 feet water over this ridge, and a black buoy on it, bearing N.E. ½ N., distant a little more than one mile from the bluff on Henry point.

The Outer Harbour of Geelong extends North and South 3½ miles between the 3-fathoms edges of the banks fronting the north and south shores, and is bounded to the eastward by the bank, which projects from Wilson point to Wilson spit. On the west side it is separated from the Inner harbour by the bank and narrow ridge extending from Lillias point and a collection of other banks, forming together a bar, which stretches across from Henry to Lillias points and the shore to the westward of it.

The soundings over the outer harbour are remarkably even, rarely varying from 4 to 4½ fathoms, except on the western side, where there are 5 to 5½ fathoms. The bottom is mostly mud, with some patches of clay.

Ship Channel.—The Ship channel, from its south-east entrance, between the white and black buoys off Wilson spit crosses the southern part of the outer harbour in a N.W. by W. direction to the outer Artificial cut through the bank, already noticed, extending from Lillias point.

Outer Artificial Cut.—This psssage, which bears N.E. by N. from the bluff on Henry point, and S.S.E. ¾ E. from Bird rock, has been dredged through the bank one cable in a S.E. and N.W. direction, and is half a cable wide, with 19 feet water.

The channel is marked by two black buoys on the south-west, and two white ones on the north-east side; the eastern buoy, which is cone-shaped, as a distinguishing mark, is moored broad end down; it swims nearly upright, and is surmounted by a staff and ball; the other three are cask buoys. There is also a white buoy on the edge of the bank at a quarter of a mile north-eastward of the white cone buoy.

South Channel.—At N.W. half a mile from the Outer Artificial cut, is the eastern entrance of the South channel that has been cut through the bank which extends from Henry point to the north shore. It is nearly 1¼ miles long E. ½ N. and W. ½ S., and 132 feet wide at the bottom, sloping to 165 feet at the surface, at its narrowest part. This channel, which has been dredged to the depth of 18 feet, has a black buoy on each side of its eastern entrance, that on the south side being surmounted by a staff and ball. Within the entrance the channel is marked on the south side by black, and on the north side by white beacons.

At 4 cables within the eastern entrance the channel communicates with a bight in the bank, extending a quarter of a mile to the southward, with 4 to 5 fathoms water; and opposite this are two other inlets having 3½ fathoms, separated by a spit, on which is one of the white beacons that mark the north side of the channel.

The 3-fathoms edge of the bank from the east entrance of the South channel trends in a S. by E. and S.S.W. direction to a small bight, with 20 feet water, within the spit before noticed to the eastward of Henry point. The western 3-fathoms edge of the bank from the western entrance of the South channel extends nearly S. by W. 2½ miles, and from thence W. by S. ½ S. three-quarters of a mile to one cable off Limeburners point, which bears S.W. by W., distant 2 miles from the Bluff on Henry point.

The shoalest part of the bank between its 6-feet edges extends from Henry point to the South channel, and is half a mile to a quarter of a mile broad, with a narrow ridge on it, which dries, trending three-quarters of a mile from the South channel towards Henry point. There is a small knoll at 1½ cables to the southward of the ridge, and on the north-eastern part of the bank is a 5-feet knoll, at a quarter of a mile to the south-westward of the black perch buoy.

The Boat Channel, which has 5 to 7 feet water, crosses the bank at a quarter of a mile northward of Henry point; it trends about W.N.W. from E.S.E. between two black buoys, bearing respectively N. ½ E., distant a little more than half a mile, and N.N.W. ½ W. two-thirds of a mile from the Bluff on Henry point.

North Channel.—The eastern entrance of this channel lies between a quarter of a mile and 4 cables westward of Bird rock beacon, with the light-vessel nearly in mid-channel in 12 feet water, at 3½ cables from the beacon. From the white perch buoy south-westward of Bird rock, the 12-feet edge of the bank which forms the eastern and northern limits of the channel, turns northward and then curves westward to a projection of the bank, close to the westward of which is a red buoy, W. by N. ½ N. a quarter of a mile from the light-vessel.

The Bar.—From the red buoy, the northern side of the channel, after trending about W.N.W. one-third of a mile, curves round 1½ cables to the bar, which is 200 yards broad, with 9 to 11 water on it.

The channel is bounded to the southward by the 12-feet edge of the bank, which, from the middle of the north side of the South channel, trends N. by E. ½ E. to a spit within 100 yards of the light-vessel, and 150 yards of the north side of the channel. Between this and another projection of the bank, on which is a black buoy, bearing West, distant half a mile from the light-vessel, is a bight in the bank, with 12 to 14 feet water, trending 600 yards to the south-westward.

From the western side of the Bar the North channel trends S.W. ½ W. one-third of a mile to its western entrance, with a width of 150 to 200 yards between the 12-feet edges of the bank, and is marked by black buoys or beacons on the southern and red on the northern side.

The south-western 3-fathoms edge of the bank from the west entrance of the South channel trends N.W. one-third of a mile to the western entrance of the North channel, and from thence 1½ miles in nearly the same direction towards the entrance of Limeburners creek. At about three-quarters of a mile to the north-westward of the entrance of the North channel, a narrow detached shoal, with 15 feet water on it, extends 800 yards along the edge of the bank, from which it is separated by a very narrow channel having 22 feet water.

LIGHT.—The Geelong light-vessel, which lies in the eastern entrance of the North channel in 12 feet water, has one mast, is painted red, and shows a single *fixed white* light, 27 feet high, visible in clear weather, 7 miles off. A gong is sounded *every ten minutes* in foggy weather. Should the vessel break adrift the ball and light will be discontinued, and two *red* lights substituted.

Tidal Signals are made on board to show the depth on the bar. A blue flag, 10 feet; a ball, 10½; a ball under a blue flag, 11; a ball over a blue flag, 11½; two balls 12 feet; two balls over a blue flag, 12½; two balls under a blue flag, 13; two balls over a red flag, 13½; two balls under a red flag, 14; a red flag between two balls, 14½; a red flag, 15 feet.

The North Shore between Lillias point and a low point at N.W. ½ W. half a mile from it, forms a bight, extending two-thirds of a mile to the north-eastward; but it is nearly filled by a flat of mud, sand, and weeds. At S.W. 1½ cables from the low point is a beacon N.W. ½ N., nearly two-thirds of a mile from Bird rock beacon.

From the low north-west entrance point of this bight the shore trends round westward and north-westward about 1⅝ miles to the south-eastern entrance point of Limeburners creek; from this point a mud spit projects W.N.W. one-third of a mile to within 100 yards of the western side of the entrance, leaving a narrow channel with 20 feet water, between the spit and the western shore.

Limeburners Creek from its entrance trends E.N.E. two-thirds of a mile, and from thence above the same distance in a N. by E. direction, and is 2 to nearly 4 cables wide. At about half a mile within the entrance a low point projects from the western shore, below which there is a basin having 7 to 13 feet water; but above the point the creek is mostly filled by a mud-flat, leaving only a narrow channel, carrying 6 to 11 and 5 feet water for about a quarter of a mile along the eastern side of the creek, and then returning south-westward towards the point.

GEELONG INNER HARBOUR, the most spacious and secure anchorage in port Phillip, extends from Limeburners point North nearly 4½ miles to the entrance of Limeburners creek, and is 2½ miles wide, between the western shore and the 6-feet edge of the bank which extends from Henry point to the north shore. The soundings are remarkably regular, over mud, the depth gradually increasing from the 3-fathoms edge of the bank on the eastern side, to 5 and 5½ fathoms within a quarter of a mile of the western shore, and to 4 fathoms at 2 cables off the town of Geelong, in the south-west bight of the harbour.

The eastern shore from Henry point extends South 2 miles to an elbow of the coast-line, between which and a low point at half a mile to the westward of it, a shallow inlet nearly half a mile wide trends three-quarters of a mile into the low flat land in an E.S.E. direction, towards Henry point township; but the inlet is filled by a mud-flat, which dries one and 2 feet above low water.

From the western entrance point of the inlet the low shore trends nearly W.N.W. 1¼ miles to Limeburners point. On the west side of the former point is a bight in the land, a quarter of a mile in extent, partly enclosing a remarkable pond in the mud-flat which projects from the bight.

The shore from three-quarters of a mile southward of Henry point to the same distance south-eastward of Limeburners point appears difficult to approach, in consequence of its being fronted by a continuous mud-flat, which extends one to 2 cables from the eastern shore, and 4 cables northward from the west entrance point of the inlet. This mud-flat is again fronted by a broad shoal bank, the 6-feet edge of which curves round in a south-westerly direction from the western entrance of the Boat channel to Limeburners point.

From Limeburners point the water frontage of the town of Geelong forms Corio bay, two-thirds of a mile deep, extending from the point N.W. by W. ¼ W. 1⅔ miles to Hutton wharf. There are generally 6 feet water within 150 yards, and 22 to 24 feet within 1½ cables of the shore.

From Hutton wharf the western shore trends N. by E. a little more than one mile to the southern point of a cove about a quarter of a mile in extent, into the head of which Cowies creek flows through the low land from the north-westward. The shore from the northern point of this cove turns round one mile to the north-eastward, and then curves in nearly the same direction 1¾ miles to the entrance of Limeburners creek.

From Hutton wharf to the cove, and from thence to the projection of the shore at one mile to the north-eastward of it, there are 4½ to 5½ fathoms water within 1½ cables of the shore; but from this projection to the entrance of Limeburners creek the shore is fronted by a bank, of which the 3-fathoms edge, at two-thirds of a mile southward of the entrance, forms a spit extending about half a mile from the shore. Between this spit and the bank fronting the opposite shore a narrow inlet, having 22 to 19 feet water, trends northward about half a mile towards the entrance of Limeburners creek.

Aspect.—The country between Melbourne and Geelong is generally low, flat, and partially wooded; it is intersected by several creeks, already noticed, and there are many small lagoons, most of which are situated near the shore within about 8 miles of Williamstown.

Station Peak.—The only hills in the neighbourhood worthy of notice appear to be Youangs, the most elevated of which is Station peak, rising from the southern portion of the group to the height of 1,132 feet. It bears nearly N. ¾ W., distant 10¾ miles from the bluff on Henry point.

GEELONG lies 45 miles south-west of Melbourne. The town is well laid out on ground sloping to Corio bay, with broad streets at right angles to each other, and large public buildings. The increased facilities given for shipping wool direct to England from the jetties alongside which large vessels can load and discharge, has led many growers and buyers to avail themselves of the saving thus effected. The country surrounding Geelong is agricultural. The population in 1881, was 21,157.

The Ballarat and Melbourne railways form a junction at about 1½ miles to the northward of Geelong station. From this junction the Geelong and Melbourne railway curves in a N.E. by N. and N.E. by E. direction nearly 32 miles over a low flat country to the Geelong junction north-westward of Williamstown.

In 1873, 97 vessels amounting to 23,896 tons, entered, and 26 vessels of 15,366 tons cleared, with cargoes. The estimated value of imports was 256,839*l.* and of exports 1,399,875*l.*

The chief articles of import are provisions, coal, grain, spirits, and timber. The chief exports, wool, gold, leather, sheep and horses. The principal trade is with the United Kingdom and intercolonial.

Yarra Wharf, nearly one mile westward of Limeburners point, projects about 330 yards from the shore into 23 feet water. There is a smaller jetty on either side of the wharf, extending about 120 yards from the shore into 6 or 7 feet water.

Moorabool Wharf, 250 yards to the westward of Yarra wharf, extends 220 yards from the shore into apparently 12 or 13 feet water. There is a red buoy moored in 25 feet water, at nearly one cable to the north-eastward of the end of the wharf. The Custom-house is situated close within this wharf.

Railway Wharf.—The railway wharf, at 100 yards westward of Moorabool wharf, extends 350 yards from the shore into about 25 feet water. This wharf is the southern terminus of the Geelong and Ballarat, and the Geelong and Melbourne railways.

Buoy.—A large red warping buoy has been placed 90 fathoms off the N.E. end of the Railway pier in 26 feet water.

Hutton Wharf, at the north-west point of Corio bay, projects about 200 yards from the shore into 15 feet water.

LIGHT.—A *fixed red* light is exhibited from the extremity of the Railway pier, visible in clear weather from a distance of 4 miles.

DIRECTIONS.*—For PORT PHILLIP from the WESTWARD.—Vessels from the westward bound to port Phillip, usually make the land about the high bold promontory of cape Otway, which is easily distinguished by the white circular lighthouse on it, showing a *revolving* light, and the telegraph station, to which passing vessels, whether bound to port Phillip or not, are recommended to show their numbers, and communicate what public intelligence they may have. *See* page 292.

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* A good look out should be kept for floating wreckage when approaching and entering port Phillip heads.

By night.—The *red* danger light is exhibited to warn mariners of approaching danger, and when seen, a vessel should alter course to run it out of sight. In thick or foggy weather, vessels should not rely on sighting the red light, but should keep a good offing.

It is desirable to round cape Otway at a distance of not less than 3 or 4 miles, and when the lighthouse bears W. by N. ½ N. distant 6 miles, the course and distance to port Phillip heads will be N.E. 56 miles, passing 3½ miles outside Henty reef; to avoid which, see page 305. As no other dangers project beyond a mile from the shore, they will be cleared by giving the coast a berth of not less than 2 miles. Should the cape be rounded early in the evening, with a fresh southerly breeze, beware of overrunning the distance, as a strong current, after a prevalence of southerly gales, often sets along the land to the N.E.; and when abreast of Split point, if a stranger find there will not be sufficient daylight to get into pilot waters, he should stand off and on shore under easy sail till daylight, not shoaling the water to less than 20 fathoms.

After passing Split point, 36 miles to the north-eastward of cape Otway, if the weather be at all clear, Arthur's Seat will be seen rising inland over the waters of port Phillip before the lower, and nearer land in that direction becomes visible. Proceeding onward, the land about cape Schanck will be seen to the eastward, appearing at first like a long low island trending to the S.E. On nearing the entrance, Barwon head will open out on the port bow. This headland, formerly known as Flinders point, is a good mark for making the port; but in thick, hazy weather care must be taken not to mistake this for port Phillip heads, which in several instances has led to vessels going ashore.

Vessels from the southward and westward, sighting Shortland bluff high light to the eastward of N.E. by E., should, to avoid Barwon bight, haul out eastward, to open Shortland bluff low light, which will be first seen on a N.E. by E. bearing; and in proceeding to bring the two lights in line, the low light will change from *white* to *red* on a N.E. bearing.

Deep water channel in between the heads. Two leading beacons have been erected, the outer red and the inner chequered black and white,—situated in Lonsdale bight, nearly 1$\frac{2}{10}$ miles from Lonsdale point and 1$\frac{6}{10}$ miles from Queenscliffe low lighthouse, and kept in line bearing N.N.W. ¼ W., lead in with not less than 42 feet at low water spring tides.

For PORT PHILLIP from the EASTWARD.—Vessels steering for port Phillip from the southward and eastward usually make the land about cape Schanck, 17 miles to the south-eastward of the entrance. The cape has a round white lighthouse on its highest part, which exhibits a *fixed and flashing* light, visible in clear weather at the distance of 23 miles. *See* page 365. Vessels having passed cape Schanck, should keep a good offing, in proceeding towards the heads, until they open out Shortland bluff lighthouses, which the intervening land of Nepean point prevents being seen before the high light bears N. ¼ W., and the low light N. ½ E.; and in proceeding to bring the two lights in line, the low light will change its colour from *white* to *red* on a N.N.E. bearing.

Caution not to Heave to.—At night, a vessel should keep a good offing, and on no account be hove to when waiting for daylight near port Phillip heads. Several vessels that have done so have drifted into danger; two, the *Sacramento* and the *Earl of Charlemont*, were lost, one on Lonsdale point, and the other on Charlemont reef, from this cause, combined with inattention to the lead and the state of the tide.

Causes of Wreck at the Heads.—A careful inquiry into the casualties which have occurred at the entrance of port Phillip has shown that in nearly every case they have taken place in consequence of the vessel's either attempting to enter the heads at night without a pilot, or against a strong ebb stream; which, it must be remembered, runs partly athwart the entrance with great force, frequently at the rate of 7 knots, causing a high confused tumbling sea, which in southerly or westerly gales, often breaks from point to point. The mariner must not suppose that because he has a fine fair wind outside the heads he can always force his vessel against the ebb. To this error is attributable the loss of several vessels. The wind, although fresh outside, frequently falls light just as the vessel gets into the tide-ripple between the heads, when she becomes unmanageable; and even with a strong breeze, vessels often shear athwart the tide, which hereabouts forms a series of strong irregular eddies.

Waiting for Tide.—By attention to the tidal signals on Lonsdale point, the time and state of the tide will be known; it is advisable for vessels waiting for the turn of tide outside the heads, to keep Lonsdale point shore aboard, where the stream runs fairer, and in bad weather small vessels incur less danger from tide-ripples, and have much smoother water.

PILOTS.—As there is constantly one pilot-vessel outside the heads, when there is a possibility to keep the sea, no stranger should attempt entering without taking a pilot; but the channels are so carefully lighted and buoyed, that it is quite possible to do so. A vessel intending to proceed from sea to Geelong, and requiring the harbour pilot, would save time by sending a telegram from the heads, stating draught of water to the harbour master, who would have a pilot ready to board the vessel off Henry point.

Buoys.—The following arrangement and classification of buoys, marking shoals, channels, wrecks, &c., have been adopted by the Government of Victoria for the harbours of that colony.

Entering from sea, white or red buoys, with even numbers, to be left on the starboard hand; black buoys, with odd numbers, on the port hand. Chequered buoys to be passed on either side; and green buoys marked "Wreck" are moored close to sunken vessels.

To Enter the Heads with the Flood.—Should a pilot not have been taken on board outside the heads, and the last quarter ebb signal be up, or the flood stream be made, steer, when within 8 or 10 miles of the entrance, to bring the high lighthouse on Shortland bluff to bear N.E. by N., which will be in line with the low lighthouse; and with a fresh fair wind and flood-stream, steer so as to keep the two lighthouses in line, until the red beacon on the rocky islet off Nepean point is open to the southward of that point.

Lonsdale rock is cleared on its east side by keeping Swan island beacon open of Shortland bluff N.E. ½ N., until Lonsdale point telegraph house, white with a slate roof, opens well to the northward of the tidal flag-staff. Vessels drawing less than 14 feet may, in the daytime, pass between Lonsdale rock and reef by keeping Swan point a little open of Shortland bluff.

A vessel entering will clear the west side of the Corsair rock by keeping the low lighthouse on Shortland bluff in line with the east end of the light-keeper's house near the high lighthouse, N.N.E. ¼ E., until the white beacon on Nepean point is well open northward of the red beacon on the rocky islet off that point.

With a scant or light easterly wind and flood stream, Swan island beacon must be kept open of Shortland bluff, so as to avoid Lonsdale rock.

To Enter the Heads against the Ebb steer, when within 2 miles of the heads, to get the low lighthouse open to the East of the high one, until the vessel draws near Lonsdale point, when haul as close round Lonsdale reef as practicable; taking care, however, if her draught be more than 14 feet, to avoid Lonsdale rock by not shutting Swan island beacon in with Shortland bluff, and on no account to shut in Swan point with Shortland bluff, until clear of Lonsdale reef, and the red beacon on the rocky islet off Nepean point is open to the southward of that point, when the rocks and reefs in the entrance will be cleared.

To Work in between the Heads, is best done near the time of slack water, when the race will be nearly quiet, and the vessel will be much more under command. In standing to the westward, Swan island beacon must be kept open of Shortland bluff until Lonsdale point telegraph house opens well to the northward of the tidal flag-staff. Vessels of light draught may stand more in-shore, keeping Swan point a little open of Shortland bluff, making due allowance for the set of the flood stream. After clearing Lonsdale rock and reef, do not bring Shortland bluff low lighthouse to the eastward of N.E. ½ E. in order to avoid Victory shoal and the foul ground between Lonsdale point and Shortland bluff. Lonsdale bight should be avoided by all vessels.

In standing to the eastward, a vessel should not proceed farther than when the obelisk on Shortland bluff touches the east side of the high lighthouse bearing N.N.E. ¾ E., to avoid the tide-ripples near Nepean point.

At Night.—The passage through the heads should not be attempted at night, except with steam or a commanding fair wind; but to enter under either of these favourable circumstances, when the high and low lights on Shortland bluff are clearly distinguished, the low light showing *red*, they must be brought in line, bearing N.E. by N., which will lead through the fairway.

Should the wind become scant, and a vessel be compelled to tack when near Lonsdale reef or the Corsair rock, these dangers will be avoided by vessels of light draught, so long as Shortland bluff low *red* light is kept in sight; but they must be careful to go about or haul towards mid-channel before the low light changes from *red* to *white*.

In entering, Lonsdale point light will first appear *green*, bearing N. by W., and so long as this colour is in full view the vessel will be to seaward of Lonsdale rock; when the *green* begins to blend with *red*, bearing N.W. ½ W., she will be in the fairway; when the *red* light opens into full view she will be past this danger; and when the *red* light is seen, on a W. by N. bearing, the vessel will be inside the Corsair rock.

ANCHORAGES.—Having entered and cleared the dangers which lie between the heads, a vessel may proceed north-eastward for the anchorage off Shortland bluff, towards the West channel; or a vessel of great draught, eastward, for the anchorage off the Sanitary station, in from 8 to 9 fathoms water, in the entrance of the South channel. *See* Caution, page 316.

Off Shortland Bluff.—If necessary to anchor off Shortland bluff before proceeding through the West channel, steer north-eastward from the entrance, keeping Shortland bluff low lighthouse to the northward of N. E. ½ E., to avoid the Victory shoal; and if of heavy draught, she should anchor on the south-east side of the fairway, which is shown in the daytime by Swan spit light-vessel being open West of No. 2 white perch buoy; at night, by Swan spit light bearing, N.E. ½ N.

With the view of keeping the fairway to the West channel clear, vessels of light draught, when anchoring off Shortland bluff, should bring up as close towards the shore as possible on the north-west side of the fairway, with Swan spit light vessel open East of No. 1 black buoy; and at night, with Swan spit light, on a N.E. ½ E. bearing.

When about to anchor off Shortland bluff at night, it must be remembered that the low light shuts in on a W. by N. bearing.

Off the Sanitary Station.—If from quarantine regulations, southerly gales, or from drawing too much water to take the West channel, it be necessary to anchor off the Sanitary station before proceeding through the South channel, a vessel should, after getting well inside the heads, steer eastward along the north side of Nepean point, avoiding the shoals which front the shore by keeping Barwon head just open of Lonsdale point; or, at night, by keeping just to the southward of the W. by S. limit of the *red* light from Lonsdale point; and having brought the high light on Shortland bluff to bear about N.W., anchor in 8 or 9 fathoms, abreast of the Sanitary station, at half a mile or three-quarters of a mile from the shore.

Not to Anchor in the Channels.—It is not advisable in bad weather, to anchor in either the West or South channel, on account of the stream and the loose nature of the bottom; but in south-west gales small vessels will find good shelter in 3 to 3½ fathoms, under Swan spit, with the high lighthouse just shut in with Swan point, at about half a mile off shore. And vessels bound up, and caught in the South channel with a northerly or north-west gale, will find anchorage in Capel sound, in 5 to 7 fathoms, sand, by bringing the White cliff to bear S.W., and the top of Arthur's seat East. But, if daylight permit, it would be better to get back to the anchorage off Shortland bluff.

No stranger should anchor close to the heads, except it be to save the vessel from going ashore; although coasters sometimes, to avoid being carried by the stream inside the heads in a calm, anchor at about a mile outside, where the bottom is sandy; and sometimes in the bight between Barwon head and Lonsdale point.

WEST CHANNEL.*—If bound directly through the West channel, after entering the heads and clearing the dangers in the entrance, steer N.E. from the fairway between Lonsdale and Nepean points, to pass on the west side of No. 2 white perch buoy, keeping Swan point well open of Shortland bluff, to avoid Victory shoal, and giving the bluff a berth of at least 2 cables, to avoid the reef which projects from it. Having passed Shortland bluff, keep Lonsdale point lighthouse open of it S.W. by W. ¼ W., which will lead clear of the bank, lying between Shortland bluff and Swan spit.

When abreast of No. 2 white perch buoy bearing S.E. by E., a cable distant, steer N.E. by E. ½ E. until Swan spit light-vessel bears N.W. by W.; passing to the eastward of the chequered buoy, steer N. ¼ E. one cable to the westward of No 6 white buoy. When Swan spit light-vessel bears S.S.W. ¾ W. bring it astern and steer N.N.E. ¾ E., (passing three-quarters of a cable westward of No. 8 white buoy) until No. 3 black buoy bears W. by S. ½ S., distant 3½ cables; then steer N. ¾ E. passing one cable to the westward of No. 10 white buoy, until West channel lighthouse bears N.E. by N.; thence steer to pass about half a cable east of the lighthouse.

Vessels with a scant wind, proceeding up against the ebb stream, must not stand too near the eastern bank, as they are liable to be set upon it, especially at the northern end of the channel.

Vessels may also enter the West channel between Pope's Eye and Royal George sands by passing 2 cables westward of the Pope's Eye red buoy, and then steering N.N.E. until the two white buoys on the Royal George sand come in line; when, after leaving the eastern white buoy about a cable to the westward, steer so as to pass to the eastward of the shoals off Swan spit light-vessel.

At Night.—Vessels steering for the West channel, will avoid the reef which projects from Shortland bluff, and the bank between it and Swan spit, and will clear the western end of Royal George shoal, by keeping the Swan spit light bearing N.E. ½ E. until the sector of *red* light exhibited from Shortland bluff low lighthouse comes in sight (page 312), which should take place when Queenscliff jetty *green* light bears about W. by N. This sector is visible between the bearings of about S.W. by W. ¼ W. and S.W. by W. ¾ W., or from black buoy No. 1, to perch buoy No. 2, at the entrance of West channel, and is intended as a guide in the fairway from Swan spit to between buoys Nos. 1 and 2; but will not be of service in judging the distance from Shortland bluff reef. When Queenscliff jetty green light bears about W. by S., they will be above No. 2 white perch buoy, and should haul to the eastward keeping rather in the southern portion of the sector until the Swan spit light bears N.W. ½ W., giving the light-vessel a berth of 3 cables in passing to the eastward of it.

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* With the exception of such occasional banks as may be formed to the northward of and about Swan spit lighthouse, and which are marked by a chequered buoy, the West channel may be considered safe for vessels drawing not more than 17 feet of water. If the tide could be depended upon, it would be quite possible and safe for vessels of 18 feet draught to use the channel, but the tides are so influenced by the winds that it will never be safe to trust to the calculated time of high and low water for rise and fall. An easterly wind has a precisely similar effect to that which it has on the outer coast, viz., that of keeping the tide low; a westerly or southerly wind, on the contrary, keeps the tide up.

That part of the channel near No. 3 black buoy, and Swan spit lighthouse, is subject to change more particularly after strong northerly winds.—*Staff-Commander H. J. Stanley, R. N.*, 1874.

Vessels when leaving should, when Queenscliff jetty light bears W. by N., haul to the eastward sufficiently to clear Shortland bluff reef.

WEST CHANNEL to HOBSON BAY.—From West channel lighthouse (which vessels should pass half a cable eastward of), the course is nearly N. by E. ¼ E., and the distance 20½ miles to Gellibrand point light-vessel. There are no dangers in the way, and the soundings are regular, gradually increasing from 9 fathoms at a mile north-eastward of West channel lighthouse to 12 fathoms midway, and from thence decreasing to 6 fathoms at one mile to the southward of Gellibrand point light-vessel; and the bottom being soft mud and shells, a vessel may anchor anywhere along this route.

At Night.—West channel light is white between N.E. by N. (through west) and S. by E. ¼ E., and red in all other directions. The red light is cut to mark No. 5 buoy of the West channel, and the black buoy off Prince George bank.

Working up.—Vessels working up from the West channel lighthouse to Hobson bay must not stand into less than 5 fathoms on either side, nor approach the western shore nearer than 3 miles, until Station peak comes on with Cook point, W. by S. ¼ S.; when, in standing to the westward, Gellibrand point light-vessel must not be brought to the eastward of N.E., nor must Gellibrand point be approached within half a mile, until to the northward of it. And it should be remembered that the bottom, at the distance of a mile off shore, from Gellibrand point to Wilson point, is rocky, with shoal patches.

Anchorage.—Having passed eastward of Gellibrand point light-vessel, which may be rounded within a cable, in 5 fathoms, the best anchorage will be found in 4 fathoms, with the old lighthouse on Gellibrand point bearing from South to S.W. Moor with the heaviest anchor to the westward in winter, and to the eastward in summer.

SOUTH CHANNEL.—If bound through the South channel, after having entered and cleared the dangers between the heads, steer along the north side of the land of Nepean point, in 8 or 9 fathoms, with Barwon head just open of Lonsdale point, nearly W. ½ S., passing half a mile to the southward of the Pope's Eye red buoy, and midway between the north chequered buoy on Nicholson knoll, and No. 1 black perch buoy at about half a mile from either. From thence steer nearly midway between the white buoys, which mark the south side, and the black buoys, which mark the north side of the channel, bringing the South channel pile lighthouse in line with Arthur's Seat lighthouse, to bear E. ¾ S. as soon as possible when steer for it. If in a vessel of large draught when at a quarter of a mile from the lighthouse haul to the northward, to avoid the 20-feet patches to the westward of the lighthouse on the line of the leading mark. For Tidal signals at South channel pile lighthouse, see page 318.

Having passed out of the South channel between the South channel pile lighthouse and No. 11 black buoy at 3½ cables to the north-eastward of it, continue East or E. ½ S. according to circumstances, so as to pass about one cable southward of No. 13 black buoy, and then steer E. by N. and round, on the south-east side, No. 15 black perch buoy, which marks the eastern spit of the Middle ground.

The banks on either side are steep-to, with the flood setting strongly over the northern banks, and the ebb over the southern banks.

Working Through.—Vessels working through the South channel must be guided by the lead, not standing into less than 4 fathoms on either side, nor within the line of buoys; bearing in mind the tide streams which set over the banks. After passing South channel pile lighthouse there is plenty of room between the Middle ground and the shore, which is approachable within three-quarters of a mile, in 5 fathoms. When clear of the Middle ground, and to the northward of Martha point, a vessel may stand westward until Station peak is open of the high land on George point bearing N.W. by W. ¼ W.

At Night.—If bound through the South channel at night after getting well inside the heads, steer eastward, taking care to keep close to the southward of the W. by S. limit of Lonsdale point *red* light, to clear the shoals which border the northern shore of Nepean point; the least depth of water being 16 feet, on the small patch which bears S. ¼ E. from Shortland bluff high lighthouse. As the low lighthouse on Shortland bluff shows a *white* light up the South channel vessels in the western entrance of the channel will avoid the northern bank by not shutting in the *white* light W. by N.; on entering the South channel vessels should steer in with the light under Arthur's Seat in line with the South channel pile light, showing *white*, bearing E. ¾ S., but vessels of large draught should, on approaching within a quarter of a mile of the South channel Pile lighthouse, open the Eastern light well to the northward of the Pile light, in order to avoid the 20-feet patches recently discovered. After passing the Pile lighthouse steer about East taking care to get into the *red* colour of the Pile light before reaching No. 13 buoy. Do not obscure the Pile light until the Eastern light under Arthur's seat shows *red*, the vessel will then be clear of the east end of the Middle ground, and may steer for Melbourne or Geelong.

Vessels outward bound will make the light under Arthur's seat more readily since the establishment of a *fixed* white light below the red light, and visible between the same bearings. *See* page 326. The Middle ground will be avoided by keeping this white light and the red light in sight.

SOUTH CHANNEL to HOBSON BAY.—Having cleared the South channel and rounded No. 15 black perch buoy, which marks the eastern spit of Middle ground, steer N. ½ W. 27 miles, which will be the course and distance from thence to Hobson bay ; enter eastward of Gellibrand point light-vessel and anchor or moor, as directed at page 352.

Working up.—As the eastern shore of port Phillip is free from outlying dangers, it may be approached within a mile from Arthur's Seat all the way up to Red cliff. Between the Anonyma shoal and Hobson bay shoal water extends farther from the shore, which should therefore be aproached according to the vessel's draught.

WEST CHANNEL to GEELONG.—A vessel bound from the West channel to Geelong should, after rounding West channel pile lighthouse, steer N. by W. 5½ miles for the black buoy off the north-east extreme of Prince George bank. Round the buoy, at the distance of half a mile to the northward of it, and then steer W. ½ S. for the black buoy off Richards point, and having rounded it at the distance of a cable haul up S.W. by W. for the white perch buoy off Wilson spit, which may be passed on eithur side, unless the vessel's draught exceeds 14 feet; in which case pass to the southward of the buoy, midway between it and the chequered buoy moored W.S.W. a quarter of a mile off. *See* page 337.

Working up.—A vessel bound from the West channel to Geelong, having a contrary wind between the West channel lighthouse and the black buoy off the north-east extreme of Prince George bank, should not stand into less than 5 fathoms, nor bring the lighthouse to the eastward of S. by E., until North of the Prince George buoy, between which and the red buoy off Richards point a vessel should not stand into less than 5 fathoms, nor bring that point to the westward of W. by S. From Richards point to Henry point the south shore should not be approached in less than 4 fathoms; and the north shore in less than 5 fathoms, until to the westward of Wilson spit, which is marked by the white perch buoy off it.

By Night.—West channel *red* light kept in sight, clears the east side of Prince George bank, and Portarlington *red* light in sight clears the north side of Prince George bank; and also the east side of the shoal water marked by a red buoy off Richards point.

Anchorage.*—If it is intended to anchor in the Outer harbour of Geelong, before entering the Inner harbour, steer W.N.W. from the white perch buoy, and come to in 4½ fathoms, with Henry point bluff bearing W.S.W., at about one mile from the shore.

From the Outer to the Inner Harbour. — South Channel.—From the white perch buoy off Wilson spit steer N.W. by W. for the upright white cone buoy at the entrance of the Outer Artificial cut. In passing through the cut leave the white buoys on the starboard, and the black on the port, hand, and then steer direct for the Bird rock beacon; taking care to keep it a little open to the westward of a gap in the trees N.W. of the rock, until the black beacons, which mark the south side of the South channel, begin to be brought in line, when haul sharp up and proceed through the channel, keeping midway between the two lines of beacons.

Vessels drawing 20 feet can, by choosing a proper time of tide, and employing steam, pass through the channel, from the Outer to the Inner harbour, and go close up to the Geelong wharves.

The height of water in the South channel can always be ascertained by adding 8 feet to the height in the North channel, as shown by the tidal signals hoisted on board the light vessel; for which *see* page 343.

Caution.—As both the flood and ebb streams set across the entrance of the South channel, care must be taken that the vessel is kept under good command, to prevent her being set on either bank.

When using the South channel its limited width must be especially remembered, so that every precaution may be taken to avoid collision with other vessels, or with the buoys or beacons. Although there is width enough in this channel for ordinary vessels to pass each other from opposite directions, it is advisible not to do so, to prevent accidents; but a vessel should wait outside either entrance when another vessel is seen entering from an opposite direction, until she has passed through.

North Channel.—A vessel of less than 9 feet draught, bound from the Outer to the Inner harbour may, as before directed, proceed for the white upright cone buoy at the entrance of the Outer Artificial cut, and having passed through this channel, leaving the black buoys on the port, and the white buoys on the starboard, hand, steer for the light-vessel, keeping her on the starboard bow until close to. Pass the light-vessel on the south-west side; then haul up for the red buoy, and bring it half a point on the starboard bow, leaving it and all the red dolphins on the starboard hand, and the black buoys and dolphins on the port hand.

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* *See* Admiralty plan, Geelong harbour, No. 2,731; scale, $m = 3$ inches.

ANCHORAGES. — Having cleared the South channel steer S.W. ½ S. 8 miles and anchor in 4½ fathoms, at 3 cables to the northward of the Geelong wharves; the bottom being soft mud mixed with sand and clay, a long scope of chain is necessary in strong winds, to prevent the vessel from driving.

Having cleared the North channel steer S.W. by S. 3¼ miles, and anchor off Geelong wharves, as directed when coming from the South channel.

Gunpowder Anchorages.—No vessel having more than 20 lbs. of gunpowder on board is permitted to anchor in the Outer harbour, within 2 miles of the shore; and in the Inner harbour, within three-quarters of a mile of Limeburners point; nor to the westward of a line bearing N.N.W. from the Powder Magazine.

Mooring.—All vessels in Geelong harbour must moor, for which purpose every vessel should be provided with a strong mooring swivel.

From GEELONG to HOBSON BAY.—Vessels of more than 14 feet draught, bound from Geelong to Hobson bay, should, after passing through the South channel and the Outer Artificial cut, proceed S.E. by E. for the white perch buoy off Wilson spit, from whence the course is N.E. ½ N., and the distance 25½ miles, to Gellibrand point light-vessel. A vessel of great draught, by first steering N.E. ½ E. until Station peak bears W.N.W., and then altering course to N.E. ¼ N. for Gellibrand point, will avoid the shoal water off Werribee river, and be outside the 5-fathoms edge of the bank between it and Gellibrand point, passing two-thirds of a mile off the black buoy which marks the shoal projecting from Cook point.

FROM HOBSON BAY OUT TO SEA by the West Channel.—Vessels bound to sea from Hobson bay by the West channel will generally clear the heads the same day, by leaving Hobson bay two or three hours before daylight, when there is frequently a moderate land or northerly wind. A S. by W. ½ W. course, 20 miles, from a fair berth off the light-vessel, leads down to the West channel lighthouse, where, if prevented by southerly gales from proceeding through the channel, a vessel will find good anchorage by bringing the lighthouse to bear S. by W., and just shutting in Station peak with Indented head.

From the northern entrance proceed through the West channel, following inversely, the directions already given for going northward, keeping the white buoys on the port, and the black buoys on the starboard, hand. Having passed Swan spit light-vessel haul more to the south-westward, passing eastward of the chequered buoy and between No. 1 black buoy on the starboard, and the Royal George white perch buoy on the port, hand, and keeping Lonsdale point a little open of Shortland bluff. After leaving the Royal George buoy keep Lonsdale point open of Shortland bluff, giving the bluff in passing a berth of about a quarter of a mile ; and in proceeding out between the heads keep the two Shortland bluff lighthouses in line astern, bearing N.E. by N., or, if in a vessel of great draught keep the lighthouses in line until the beacons in Lonsdale bight come in line bearing N.N.W. ¼ W., which kept so will lead out in not less than 42 feet at low water spring tides ; due attention being paid to the tide streams which do not set fairly through the channel.

South Channel.—Vessels bound out to sea from Hobson bay by the South channel should steer from Gellibrand light-vessel S. ½ E. 27 miles, for No. 15 black perch buoy, which marks the east spit of the Middle ground, after rounding which haul up S.W. by W. for the White cliff, until South channel pile lighthouse comes open to the northward of Observatory point flag-staff; then steer for the lighthouse, pass close to the northward of it, and bring it in line with Arthur's Seat lighthouse; these kept in line astern, bearing E. ¾ S., will lead down in mid-channel, leaving the white buoys on the port, and the black buoys on the starboard hand.

Continue the W. ¾ N. course so as to pass midway between the chequered buoy on Nicholson's knoll, and No. 1 black buoy to the northward of it. From this position steer W. ½ S. leaving the Pope's Eye red buoy a good half-mile on the starboard hand, taking care to keep Barwon head just open of Lonsdale point until Shortland bluff lighthouses are in line N.E. by N., with which marks on astern, proceed out between the heads to sea, or if in a vessel of great draught, when the beacons in Lonsdale bight come in line bearing N.N.W. ¼ W., alter course and steer out with them so astern, *see* page 346, paying due attention to the tide streams.

By Night. — The middle ground will be avoided by keeping the white and red lights shown from the lighthouse under Authur's seat both in sight.

Working.—Vessels leaving Hobson bay against strong southerly winds, especially during the summer months, when these winds prevail, will sooner get to sea by working down the east side of port Phillip, and going through the South Channel, where having smooth water, they will be enabled to lead through the South channel, down to the entrance between the heads. Whereas, by beating down the middle of port Phillip, and taking the West channel, moré swell would be experienced, and a large vessel would probably have to anchor off the West channel lighthouse, and wait for a shift of wind.

To work out between the heads, the tides must be attended to, and it is better to do so near slack water, when the race will be nearly quiescent and greater command of the vessel be obtained. With an ebb tide and light winds, be careful not to be drawn into the bight between Shortland bluff and Lonsdale point, the ebb tide setting from thence directly over Lonsdale point reef. A vessel within its influence, nearly becalmed, and having only her sails to trust to, has no resource but that of dropping her anchor, which she is nearly certain to lose, from the rocky nature of the ground.

From GEELONG OUT TO SEA by the West Channel.—From the Outer Artificial cut steer S.E. by E. for the white perch buoy off Wilson spit, and from thence N.E. by E. for the red buoy off Richards point. Having passed close outside this buoy, haul in E. ½ N. to go half a mile northward of the black buoy off Prince George bank, and when it comes in line with Indented head, steer S. by E. ¼ E. for the West channel pile lighthouse from whence proceed through the channel and out to sea, as directed when going from Hobson bay.

By the South Channel.—A vessel bound to sea from Geelong by the South channel, should proceed as just directed, from the Outer Artificial cut to half a mile northward of the black buoy off Prince George bank; and from thence proceed S.E. ½ S. 15 miles for the black perch buoy, which marks the eastern spit of the Middle ground, and having rounded this, follow the directions given for proceeding out to sea from Hobson bay by the South channel.

Anchorage.—Vessels having good ground-tackle may, if necessary, anchor in any part of port Phillip above the entrance banks, there being nowhere a greater depth than 15 fathoms, and good holding-ground.

Outside the Heads.*—Steam and coasting vessels from port Phillip bound round cape Otway, encountering heavy weather, might, instead of running back to the heads, find shelter in Louttit bay, in 5 to 7 fathoms, within half a mile of the shore, sheltered from all winds from South, round westerly, to N.E.; or in Apollo bay, in 7 fathoms, at about a mile off shore, with Bunbury point flag-staff S.W. by S., and cape Patton

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* *See* Admiralty plans, Anchorages in Bass strait, No. 1,694.

N.E. by E. Vessels availing themselves of either of these bays have only to round the reefs off the points, at a moderate distance, and may then choose an anchorage in 5½ fathoms, sand. *See* pages 305, 306.

TIDES.—It is high water, full and change, at Lonsdale point at 9h. 42m.; springs rise 7 feet; neaps rise 5½ feet. Within the heads the tides are most irregular, the narrow entrance to the large basin within checking the fair course of the tidal wave; hence after southerly gales it may be high water all day, and the contrary with northerly gales.

On the average, it is high water, full and change at :—

		h.	m.		ft.	in.		ft.	in.
Queenscliff -	- at	10	50	springs rise	3	1;	neaps rise	2	0
Nepean point Quarantine station	„	10	53	„	2	8	„	1	6
Dromana bay -	„	2	19	„	2	11	„	2	6
Snapper point -	„	2	14	„	2	8	„	2	0
Ballarine jetty -	„	2	21	„	2	6	„	2	0
Bird rock -	- „	2	30	„	3	6	„	2	6
Henry point and Geelong -	„	2	39	„	2	11	„	2	6
Williamstown - Hobson bay - -	„	2	31	„	2	8	„	2	2
Melbourne quay, near the bridge	Tides, 17 minutes later than at Williamstown; range the same.								

The mean water, or half tide level, varies as much as the rise and fall of the tide, it being influenced by the strength and direction of the wind outside the heads. Southerly gales cause an elevation of both high and low water, and northerly gales have a contrary effect; the latter will sometimes keep back the flood tide for an hour, or even 1½ hours later than the time by calculation.

TIDE STREAMS.—Set of the Flood.—The flood stream comes from the southward and eastward, increasing in strength as it nears the heads, setting right into the entrance, across and through the reefs, with great force, spreading towards Shortland bluff and King point. The stream decreases in strength as it enters the channels, setting towards Swan point and through the West channel in an oblique direction, tending towards Coles channel and Indented head; and above the West channel lighthouse, to the N.W. across Prince George bank; spreading from thence towards Geelong, Cook point, and Hobson bay. In the South channel the flood stream sets to the E.N.E., across the Middle ground, through Pinnace channel, and spreads along the eastern shore towards Hobson bay.

Set of the Ebb Stream.—The ebb sets out of Hobson bay southeastward for a few miles, when it takes a more southerly direction, toward Prince George bank; then tending obliquely through the various channels, the stream from Symonds channel joining and turning that of the West channel below the Royal George buoy, setting towards the bight between Shortland bluff and Lonsdale point, and from thence out through the heads with great force; the body of the stream setting athwart the entrance towards Nepean point, and away to the S.E., along the land and in to the shore between Nepean point and cape Schanck.

Between the heads the stream runs from 5 to 7 knots; in the West and South channels between 2 and 3 knots; and about 1¼ knots in the broad space above the channels. In Hobson bay during the winter months, there is always a surface current running out, owing to the freshets from the river Yarra; this current frequently sets along both sides of the bay, at the rate of 2 knots. The stream is weak in Geelong bay, except in the ship-channel, where it sets 2¼ knots across the bar, and becomes weaker as it spreads over the Inner harbour of Geelong.

Mooring.—All vessels in Hobson bay and Geelong harbour must moor with two anchors, for which purpose every vessel should be provided with a strong mooring swivel.

Repairs.—There are several foundries in Melbourne and Geelong, where steam vessels can get any part of their machinery repaired. It is advisable, however, that steamers coming direct from England or America, should be provided with duplicates of such portions of their machinery as may be most liable to give way.

Water.—Vessels in Hobson bay can water by sending boats under the spout at the Sandridge watering-place, or get supplied by floating tanks.

Water Police.—The water police are quartered on board a vessel in Hobson bay, and at all times row guard amongst the shipping.

Signals.—The following signals are in use at the ports of Melbourne and Geelong:—

Mails on board -	White flag at the fore, to be kept flying till the mails are out of the ship.
Gunpowder on board	Union jack at the main.
Government immigrants on board -	Ensign at the mizen-head.
Sea pilot - -	Union jack at the fore topgallant mast-head.
Harbour pilot -	Ensign at the fore topgallant mast-head.
Boarding officer -	Blue flag at the main, to be kept up till cleared.
Medical assistance -	Letter B at the peak.

Water police	Day signal, Ensign at the main topgallant mast head; by night, two lights vertical, five feet apart, at the mast-head or peak.
Customs boat	Union jack at the peak.
Steam-tug	Rendezvous flag at the peak or mizen-mast.
Clearing officer outwards	White flag at the main when the master is on board.
Water	Letter M at mizen.

Time Signals.—A black time ball is dropped daily, Sundays excepted, from a staff on the old lighthouse at Gellibrand point, at one o'clock, Melbourne mean time, equivalent to 15 h. 20 m. 5·2 s. Greenwich mean time. A ball is also dropped from the telegraph office, Geelong, at 1 h. 0 m. p.m., Melbourne mean time. At the signal station, Queenscliff, a flag is dipped in coincidence with the time ball signals.

Adjustment of Compasses.—Moorings have been laid down in Hobson bay, about 3 cables due North of the inner white buoy of St. Kilda bank, in 24 feet at low water, for the convenience of heavy draughted iron vessels. Six buoys are moored in Hobson bay, in 17 feet water, about half a mile westward of Sandridge railway pier, for vessels swinging to ascertain the error of their compasses. Gellibrand point old lighthouse the fall of mount Macedon, and spire of Wesleyan chapel, Melbourne, are conspicuous objects; a bearing of either of these, in line with the ship, observed from the shore with a reliable compass, will give a correct magnetic bearing with which to compare those taken from the ship.

It is now generally known that the deviation of compasses is not confined alone to iron vessels, but that a greater amount of deviation exists in vessels built of wood than has been hitherto believed; and that many casualties attributed to currents, &c., may with greater justice be traced to compass deviation. Vessels have the use of the buoys free of charge on application to the Chief Harbour Master.

There are several compass adjusters, who, if required, swing the vessel and furnish tables of deviation, for which they make a small charge.

Commanders swinging their own vessels should take them to the buoys as nearly in their sea-going trim as possible; anchors and chains in their usual places, boats hoisted up, &c.; and in the case of steam vessels, have their steam up.

Barometers.—With the view of enabling commanders to test the accuracy of their barometers, the Government Astronomer issues daily in the newspapers a notice from the Williamstown Observatory, showing the height of the standard barometer for the previous day, a comparison with which and the height of the vessel's barometer—the altitude being the same—will show the error, if any. The attention of masters of vessels is specially invited to this notice, as it is evident that the value of meteorological data, collected by different vessels, will be materially enhanced by the barometer readings agreeing with the standard.

Ships' Log-books.—The Chief of the Melbourne Magnetic Observatory invites commanders of vessels to deposit their log-books with him for a few days, to enable him to glean facts important to nautical science, for the purpose of constructing wind and current charts of these coasts. The immigration officer will take charge of any log-books for transmission to the Observatory, and return them within four days.

Port Regulations.—Quarantine.—Masters of vessels arriving, to report to the pilot the places at which they loaded and touched, and to answer all questions respecting the health of the crew and passengers, under penalty of 100*l.*

The pilot is to give notice to the master if the vessel is liable to quarantine, whereupon he shall hoist a yellow flag, under penalty on the master of 100*l.*

Pilots conducting vessels liable to quarantine to any place not specially appointed for such vessels, liable to a penalty of 200*l.*

A master refusing to deliver to the superintendent of the quarantine station the bill of health, manifest, &c., liable to a penalty of 100*l.*

A master quitting, or suffering persons to quit, his vessel, if liable to quarantine, or not conveying such vessel to the place appointed, liable to a penalty of 400*l.*

Persons quitting such vessels liable to a penalty of 300*l.* and six months' imprisonment.

And all persons neglecting duty, damaging goods, or landing, receiving, or secreting goods, &c., from vessels liable to, and actually performing, quarantine, are subject to penalties varying from 100*l.* to 500*l.*

All vessels from other than Australian ports must undergo an examination at the Heads by the health officer.

Mails.—There are three lines of mails by which correspondence are transmitted to and from Melbourne, leaving at different dates but regular intervals. These are the Peninsular and Oriental Co.'s service every fortnight; the Orient line every fortnight; and the Compagnie des Messageries Maritimes every four weeks.

The interval between London and Melbourne by the P. and O. Co.'s service *viâ* Brindisi is about 40 days, and *viâ* Southampton 47 days. From Melbourne to London the interval is, *viâ* Brindisi about 40 days, and *viâ* Southampton 47 days.

Gunpowder.—All vessels arriving in the ports of Victoria having more than 20 pounds of gunpowder on board shall hoist the Union jack at the main, and remain at anchor at the appointed place until such gunpowder be landed. Twenty-four hours are allowed, after anchoring, for landing what gunpowder there may be on board, at the appointed magazine. Gunpowder to be landed or removed only between sunrise and sunset; and at the expense of the proprietor or importer, under the supervision of the inspector of the water police, who upon application sends an officer in charge of the powder-boat.

Gunpowder Anchorages.—No vessel having more than 20 pounds of gunpowder on board, arriving in or off any of the under-mentioned ports of Victoria shall be permitted to anchor within the limits herein-after specified, viz.:—

Port of Melbourne, within three-quarters of a mile of Gellibrand point; nor to the northward of a line bearing East from the light-vessel.

Portland bay, within three-quarters of a mile of the shore; nor to the northward of a line bearing East from the lighthouse.

Port Fairy, within three-quarters of a mile of the shore; nor to the westward of a line bearing N.N.E. from the lighthouse.

Port Warrnambool, within half a mile of the shore; nor to the westward of a line bearing S.S.W. from the beach lighthouse.

Port Albert, within 2 miles of the wharves; nor to the northward of Sandy island.

Damaging Buoys, &c.—Any person damaging light-vessels, buoys, or beacons is liable to a penalty of 100*l.* to 20*l.*

Pilotage.—The employment of pilots is optional with all vessels belonging to Her Majesty.

MELBOURNE.—Few cities can boast of so rapid a rise as Melbourne. In 1835 its first founders, Messrs. Batman and Fawkner, settled here, when the population numbered 14. By the census of 1841 its population was 4,440; by that of 1846 it was 10,945; and by that of 1851, two months before the gold discoveries, it was 23,143. In 1881 the area of the city was 7 square miles, and the population, including suburbs, amounted to nearly 300,000 inhabitants.

Melbourne, the seat of government for the colony of Victoria, is regularly planned, with broad straight streets at right angles to each other, and has many handsome public buildings. Its secure port and central position, with the network of railways and rivers connecting Melbourne with a large portion of Australia, seem destined to command for it the chief export and import trade of an immense pastoral and agricultural district, independently of the demands of the gold-fields.

There is good wharf accommodation for steam vessels and other craft drawing 15 feet water at ordinary spring tides, and 16 feet at high springs, Yarra river having been made navigable for such, and works are now in progress for further improvements in this direction. The principal articles of import are, manufactured goods of all kinds, provisions, machinery, railway materials, coal, timber, wine, spirits, &c. The principal exports are gold, live stock, hides, wine, timber, and wool.

The principal trade appears to be with the United Kingdom. By custom-house returns for 1881, the value of imports into the colony in that year amounted to 16,718,521*l.*; the exports to 16,252,103*l.* The number of vessels entered with cargoes was 2,125, amounting to 1,219,231 tons; and 2,123 vessels, amounting to 1,192,671 tons cleared with cargoes.

CHAPTER V.

AUSTRALIA.—SOUTH COAST, PORT PHILLIP TO CAPE HOWE.—BASS STRAIT.

VARIATION IN 1884.

Cape Schanck 8° 10′ E. | Cape Howe, 9° 30′ E.

The NORTHERN COAST of BASS STRAIT from Nepean point extends S.E. ¾ E. 16 miles to cape Schanck, and may be approached to one mile in 8 to 16 fathoms. The most elevated hill along it is 433 feet high, at North 2 miles from the cape.

CAPE SCHANCK, the southern extremity of the peninsula which separates port Phillip from port Western, is a narrow cliffy head 278 feet high, close off which is the remarkable Pulpit rock, with a smaller rock lying S. by E., nearly a quarter of a mile from the cape. There is telegraphic communication between cape Schanck and Melbourne.*

Caution.—The reef to the southward of Pulpit rock lies S.S.E. about 7 cables from the lighthouse; vessels in passing the light must therefore give it a wide berth.

LIGHT.—The lighthouse on the highest part of cape Schanck, at about half a mile N.N.W. from Pulpit rock, is a *white* circular stone tower about 70 feet high, and exhibits at the height of 328 feet above the sea, a *fixed* light, *flashing every two minutes*, visible 23 miles off, between the bearings of W. ¼ N. and S.E. ¾ E. When within 6 miles of the light, the eclipses will be scarcely observable, and a faint light will be seen between the flashes.

It will always be desirable for vessels to get sight of cape Schanck before they run far into the great bight for port Phillip; and if the wind blow strong from the southward, it will be unsafe to run without having seen it. The cape is also an excellent mark for vessels desirous to go into port Western, the western and principal entrance of which lies between 7 and 10 miles to the eastward of the cape.

On the east side of cape Schanck a rocky bight extends E. by N. ½ N. 1½ miles to Barker point; and at half a mile to the W.N.W. of the point is a small stream of fresh water. From Barker point the coast, which is closely bordered with rocks, trends E. by N. ½ N. 5½ miles to West head.

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* *See* Admiralty charts of Bass strait, Nos. 1,695 a and b; scale, *m* = 0·20 of an inch; also port Phillip, No. 1,171 a; scale, *m* = 1 inch.

West Head, a cliffy projection 85 feet high, and enclosed by reefs, with a 10-feet rock lying S.E. two-thirds of a mile from it; this head forms the western point of port Western.

PORT WESTERN[*] is an extensive bay, protected from the sea by Phillip island, between the west point of which and West head is the West entrance to the port; the East entrance being a narrow channel separating the east end of the island from the mainland, to the eastward.

The Northern shore of port Western, from West head, curves N.N.E. ½ E. 7½ miles, and from thence E. ¾ S. 5 miles to Sandy point, forming a bight, the north-eastern and greatest portion of which is occupied by shoal water, thickly strewed with knolls, extending from the shore to Middle bank, which trends S.W. by W. ½ W. 4½ miles, and S.S.W. 2 miles from Sandy point.[†] The high land near Barker point open of West head bearing W. by S. ½ S. until Tortoise head bears N.E. ¾ E. clears the south-west edge of the bank. Between the south-west spit of this bank and West head there are 4 to 10 fathoms.

LIGHT.—A *fixed* light is exhibited, from a lamp-post 24 feet high, on the outer end of Flinders jetty, a small jetty N.W. two-thirds of a mile, from West head. The light is *white* between the bearings of N.W. ¼ N. and W. ½ S., and *red* north of the latter bearing, and can be seen 4 miles.

Anchorage.—Vessels anchoring off the jetty should, to avoid fouling the submarine cable, anchor within the limits of the bearings of the *red* light by day, and with the *red* light in sight by night.

Grant Point, E. by S. ½ S. 4½ miles from West head, is a craggy projection, forming the west extreme of Phillip island, and has a reef extending W.S.W., a quarter a mile to Round islet, which is 98 feet high. At S.W. ½ S. three-quarters of a mile from this islet is Black rock, which is 34 feet above high water and fringed by a reef, on which the sea breaks heavily with a southerly swell; between the reef and Round islet is a passage with 5½ to 7 fathoms water, available for small craft, on an emergency.

The Southern shore of port Western, from Grant point, trends N.N.E. one mile to the rocky south-west point of Cat bay; reefs project a quarter of a mile from this shore and from the south side of the bay. From the bight of this little bay the western and northern coast of Phillip island sweeps round N. by E. ½ E. 2½ miles to McHaffie reef, which is marked by a white buoy; then N.E. 2 miles to Red rocks, off which is a buoy; and eastward 5 miles to Observation point, the north-east extreme of the island;

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[*] *See* Admiralty plan of port Western, No. 1,707; scale $m = 1$ inch.

[†] Middle bank has extended about half a mile to the south-west.

for the first 4½ miles it is bordered by reefs, and from thence to the point it is steep and sandy; none of these reefs project beyond a quarter of a mile from the shore.

Observation Point, which is low, broken, and swampy, is separated from the higher land to the southward of it by a shallow creek, 2 cables wide at its mouth, from whence its branches to the south-westward.

The West Entrance of port Western, which lies between West head and Grant point, is 3½ miles wide, between Black rock and the 10-feet rock off West head, with 15 fathoms in mid-channel, and 5 to 6 fathoms close to the rocks on either side; and being open and free from any other hidden danger, it is easy of access, and affords sufficient room for a vessel of any size to work in or out. From 3½ miles within the entrance a clear channel one to 1½ miles wide, with 6 to 17 fathoms water, extends N.E. ¾ E., between Phillip island and Middle bank, to abreast of Sandy point, where the port divides into two arms, one trending North and the other East.

Tortoise Head, E. by N. ¼ N. 1¾ miles from Sandy point, is the south end of a table-topped isle nearly one mile long, with a low point projecting from its west side; reefs extend a quarter of a mile from this and the head, and a spit, with 13 feet water on it, projects S.W. three-quarters of a mile from the latter.

French Island, on the north side of the eastern part of port Western, is 11 miles long, East and West, and 7½ miles broad at its west end, between Tortoise head and Scrub point, whence it narrows to 4 miles toward Spit point, the east extreme of the island. The southern and greater portion of the island is hilly; but the north-western part and northern shore are low and marshy. From the south-west extreme of French island its southern coast trends E. by S. ½ S. 3¾ miles to its south point; between this and Finger point, at N.E. ¾ E. 2 miles from it, is a shoal bight, in the entrance of which is Elizabeth isle, 60 feet high.

The bights formed between Tortoise head and the south point of French island, and that from thence to Finger point, are filled with mud-flats having one to 5 feet water on them at high water, with navigable creeks reaching in to the shore. From a 15-feet spit, marked by a buoy, at S.S.W. ½ W. 1¼ miles from Tortoise head, the 5-fathoms edge of the bank, which is mostly covered by these mud-flats, trends East 4 miles, and then sweeps round close outside Elizabeth isle, to Finger point.

The North Arm of port Western is one mile wide, between Sandy point and the spit 1¼ miles S.S.W. of Tortoise head; and from its entrance trends N. ½ W. 10 miles to Watson inlet, with increasing width to 3 miles between Scrub point which is the north point of French island and the western shore.

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[†] Middle bank has extended about half a mile to the south-west.

for the first 4½ miles it is bordered by reefs, and from thence to the point it is steep and sandy; none of these reefs project beyond a quarter of a mile from the shore.

Observation Point, which is low, broken, and swampy, is separated from the higher land to the southward of it by a shallow creek, 2 cables wide at its mouth, from whence its branches to the south-westward.

The West Entrance of port Western, which lies between West head and Grant point, is 3½ miles wide, between Black rock and the 10-feet rock off West head, with 15 fathoms in mid-channel, and 5 to 6 fathoms close to the rocks on either side; and being open and free from any other hidden danger, it is easy of access, and affords sufficient room for a vessel of any size to work in or out. From 3½ miles within the entrance a clear channel one to 1½ miles wide, with 6 to 17 fathoms water, extends N.E. ¾ E., between Phillip island and Middle bank, to abreast of Sandy point, where the port divides into two arms, one trending North and the other East.

Tortoise Head, E. by N. ½ N. 1¾ miles from Sandy point, is the south end of a table-topped isle nearly one mile long, with a low point projecting from its west side; reefs extend a quarter of a mile from this and the head, and a spit, with 13 feet water on it, projects S.W. three-quarters of a mile from the latter.

French Island, on the north side of the eastern part of port Western, is 11 miles long, East and West, and 7½ miles broad at its west end, between Tortoise head and Scrub point, whence it narrows to 4 miles toward Spit point, the east extreme of the island. The southern and greater portion of the island is hilly; but the north-western part and northern shore are low and marshy. From the south-west extreme of French island its southern coast trends E. by S. ½ S. 3¾ miles to its south point; between this and Finger point, at N.E. ¾ E. 2 miles from it, is a shoal bight, in the entrance of which is Elizabeth isle, 60 feet high.

The bights formed between Tortoise head and the south point of French island, and that from thence to Finger point, are filled with mud-flats having one to 5 feet water on them at high water, with navigable creeks reaching in to the shore. From a 15-feet spit, marked by a buoy, at S.S.W. ½ W. 1½ miles from Tortoise head, the 5-fathoms edge of the bank, which is mostly covered by these mud-flats, trends East 4 miles, and then sweeps round close outside Elizabeth isle, to Finger point.

The North Arm of port Western is one mile wide, between Sandy point and the spit 1½ miles S.S.W. of Tortoise head; and from its entrance trends N. ½ W. 10 miles to Watson inlet, with increasing width to 3 miles between Scrub point which is the north point of French island and the western shore.

The channel of the North arm is on the west side, between the mud-flat which projects one to 4 cables length from the shore, and the banks which extend a quarter of a mile to 2 miles from the west side of French island. This channel is three-quarters of a mile to one mile wide with 11 to 6 fathoms water, from the entrance to abreast of the north point of the island. The banks on the east side of the arm are separated from French island by a passage about one-third of a mile wide, with 3½ to 8 fathoms water in it, but it is encumbered with shoal patches.

At N.W. by N. 2 miles from Sandy point is a shoal inlet; and between Crib point, at N. by W. ¾ W. 4 miles, and Long islet, N. by W. ¼ W. 6 miles from Sandy point, the low western shore forms a bight, in the southern part of which is Sandstone isle, lying N.N.W. 1¼ miles from Crib point. This bight is filled by a flat, intersected by creeks, the largest of which, from half a mile north-eastward of Sandstone isle, winds north-westward about 1½ miles to the town of Hastings; this creek is marked by beacons, and has irregular depths of one to 5 fathoms.

Off Stony point at 2½ miles, and at 4½ miles northward of Sandy point, 4 fathoms shoals project half a mile from the bank which borders the western shore. A beacon has been erected on a patch of rock just awash at low water, off Stony point reef island, at a little more than a cable off the point. The beacon is 20 feet high with a 4½-feet square painted white.

There are several shoal patches N.W. of Scrub point (the north point of French island), that on the northern side of the fairway being Eagle rock, which is awash at low water and marked by a beacon, standing N.W. by N. 1¼ miles from the point.

A beacon bearing N. by E. at a little more than three-quarters of a mile from Scrub point has been erected on Crawfish rock on the south side of Bagge harbour. The beacon is 16 feet high, with a 5-feet square painted white.

A black cask buoy has been laid down in 8 feet at low water, to mark the dangers off Adams point, with the following bearings:—Brilla island S. ¾ E.; Eagle rock W. by S. ½ S.; and Crawfish beacon S.W. ¼ W.

Between Scrub point and Quail island, 2½ miles to the northward of it, in which space is Bagge harbour, the North arm turns eastward into a sheet of water extending 9 miles East and West, and 4 miles across, between the north side of French island and the low mainland to the northward and eastward, the north shore being intersected by numerous creeks and inlets. This sheet of water is occupied by a mud-flat, with 6 to 8 feet on it at high water, ordinary springs, and numerous channels branching into it from the North arm. There are 13 to 4 fathoms for out 4 miles into the flat from Eagle rock; but few of the smaller branches of this navigable water carry 6 feet water to within half a mile of the low woody shores.

Anchorage.—There is anchorage at the entrance of the North arm in 7 fathoms water, at a quarter of a mile to the eastward of Sandy point.

Hastings, a post town, 41 miles from Melbourne, with a population in the district in 1881 of 771, it is an extensive fishing station, and supplies the Melbourne market to a considerable extent, with which place it has daily communication by coach, and occasionally by steam vessel.

Light.—A *fixed* light is shown from the end of Hastings jetty, and should be seen in clear weather from a distance of 3 or 4 miles. Towards the channel the light is *red.*

The East Arm of port Western, between the north side of Phillip island and the bank which extends from the south shore of French island, is 1¼ miles wide, with regular soundings in 7 to 9 fathoms. At one mile North of Observation point is the west point of a narrow spit, with 12 to 6 feet water on it, projecting W.S.W. and West 2¾ miles from the shoal flat which nearly fills the eastern end of port Western. Between this spit and the north-east extreme of Phillip island there is a bight in the shoal flat, extending 2 miles East and West, and one mile across, where vessels may anchor in 6 to 8 fathoms sand and shells. From the west point of the spit the northern branch of the East arm sweeps round eastward and north-eastward past Elizabeth island and Finger point, and is two-thirds of a mile to half a mile wide, with 4½ to 11 fathoms water between the banks which border the south coast of French island, and the shoal flat that fills the east end of the port.

Settlement Point, E. ½ N. 1¼ miles from Finger point, is a rocky projection of the mainland, between which and the south-east extreme of French island, at W.N.W. 1¼ miles from it are Pelican isles and Snapper shoal, the latter marked by a beacon. The islet lies W. by N. half a mile from Settlement point, with which it is connected by a reef; and Snapper shoal, which lies between Pelican islet and French island, divides the East arm into two narrow channels with only 3¼ to 4 fathoms water.

From Settlement point the coast trends E ¾ N. 3 miles to Queensferry, between which and Passage point, at one mile N.E. of the east (Spit) point of French island, is a bight 2 miles deep, forming between it and the island a sheet of water 2½ to 3½ miles wide, the south-eastern and greater portion being filled by mud-flats, having 6 to 9 feet on them at high-water springs. The East arm branches into this space and round the east point of French island, much as the North arm does into the mud-flat north of the island.

Light.—A *red* light, which is visible 3 miles, is exhibited from the end of Queensferry jetty.

DIRECTIONS.—The tide-streams always raise a sufficient ripple to break on the banks which form the north-west side of the main channel, giving timely notice of the shoal water on that side; but if this cannot be trusted steer for Tortoise head, bearing N.E. ¾ E., and well open of the north-west point of Phillip island, to avoid McHaffie reef which projects from it. To clear Middle bank, *see* page 366.

The white buoy off McHaffie reef, and the buoy on the edge of the shoal near Red rocks must be left on the starboard side.

The northern coast of the island, although bold, should not be approached within half a mile, as the tide-streams set along it with great velocity, and may, in light winds, sweep a vessel too near the shore. Having arrived abreast of Sandy point, proceed up northward or eastward.

Anchorage.—There is good anchorage in 8 fathoms, at half a mile off Observation point.

PHILLIP ISLAND is 12 miles long, and 4¾ miles across, at its western and broadest part; the eastern end of the island being a peninsula, connected with the western part by an isthmus half a mile broad, at 8½ miles eastward of Grant point.

Quoin Hill, N.E. by E. ½ E. 3½ miles from Grant point, is 218 feet high.

South Coast.—From Grant point the irregular and rocky south coast of the island curves East 5 miles to a point, close off which is the high needle-shaped Pyramid rock. Between Pyramid rock and cape Wollamai, E. by S. 7 miles from it, the coast forms a bay 2 miles deep, affording anchorage at one mile north-eastward of Pyramid rock, sheltered from north-west and northerly winds. The northern shore of the bay consists of a range of low sand-hills covered with scrub, and is bordered by reefs none of which appear to extend beyond one-third of a mile off shore.

CAPE WOLLAMAI, the south-east extreme of Phillip island, is a remarkable helmet-shaped granite headland, of a reddish colour, rising abruptly from the sea to the height of 332 feet, from whence it slopes towards the N.W., forming a peninsula nearly 1½ miles long, N.W. by N. and S.E. by S. and three-quarters of a mile broad. This head is the more conspicuous from its being the highest land on Phillip island, all the remaining portion of it being covered with low hills, clothed in an almost impervious scrub. The cape is fringed with dry and covered rocks; but none extending beyond a quarter of a mile from the shore.

Sandy Peak, 161 feet in height, is the highest and most southerly of the sand-hills, on the east end of Phillip island. The peak is steep, well defined, and marked by a cross beacon on the top, and is a good mark for the anchorage.

Red Point, North one mile from the south-east point of cape Wollamai, is a mass of red granite boulders, 50 feet high, and is marked by a black open framed wooden beacon standing 40 feet from the water's edge.

Woody Point.—Between Red point and Woody point, at N. ¾ W. 2 miles from it, the east end of Phillip island forms a bay nearly 1¼ miles deep, with rocky points and sandy beaches, bordered by a bank, of which the 3 fathoms edge projects one cable to half a mile from the shore, the edge being marked by three black beacons, one at N.W. ½ W. half a mile from Red point, one at 3 cables S. by W. ½ W. from Woody point, and the other on the easternmost Middle rock which covers at half tide, at nearly one cable E. ½ N. from the point.

The North-east Coast of Phillip island, between Woody point and the bluff, close to the south-eastward of Observation point, forms a bay 2 miles deep, divided by a broad projection, into two bights, that to the southward being Swan corner. Between one and 2 miles N.W. by W. of Woody point, is Churchill isle.

This bay is filled by a mud-flat, partly dry at low water, the outer edge of which, from Woody point, trends N.N.E. ½ E. 1¼ miles to a spit, marked by a buoy, and from thence N.W. by W. 4½ miles to Observation point. This mud-flat is intersected by several creeks, the largest of which, from its entrance, at three-quarters of a mile S.E. by E. of Observation point, trends S.E. by S. and S.S.W. 3 miles, carrying 3 to 6 and 2 fathoms to within half a mile from the shore of Swan corner.

The East Entrance into port Western is available at high water for vessels of 12 feet draught. The outer heads of the entrance are Red point, already described, and Griffith point.

Griffith Point, N.N.E. ½ E. nearly one mile from Red point, is a bold sandstone bluff 70 feet high, and bare of trees for some distance inland, and fringed by a reef. From Griffith point the coast trends N.W. by N. 1¼ miles to Davis point, which is low, sandy, and wooded to the water's edge, with a pillar beacon on it, surmounted by a white ball. Between this and Woody point, a quarter of a mile to the northward of it, are the Narrows.*

An extensive bank, with dry patches on it, and only 4 feet water over most parts of it, projects about one mile from the coast between Griffith and Davis points; its outer edge being marked by a white beacon at one mile N.W. of Red point, and a white buoy at half a mile North of the beacon. From this buoy the edge of the bank trends north-eastward to Davis point, at one cable off which is a red buoy, moored in the Narrows.

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* A coal shaft has been opened at N.E., three-quarters of a mile from Davis point, close to the water's edge.

In bad weather, especially during the ebb, the sea breaks over the edge of the bank.

Light.—A *fixed green* light is exhibited from Griffith point jetty, the light is visible for 2 miles.

Water.—Excellent water can be obtained at all times, at the fisherman's hut, just within Red point.

The East Entrance Channel, which lies between the bank just described and that which borders the western shore, is one to 3 cables wide, with 5 to 3 fathoms for one-third of a mile above Red point. From 2 cables below the first black beacon to the Narrows, the channel varies from 50 or 60 yards near the beacon to 250 yards in width, with 3¼ to 5 fathoms, and 6 fathoms in the Narrows.

From the Narrows into port, the passage through the banks, which has only 5 to 12 feet water, leads N.N.E. ¼ E. from the east side of the beacon off Woody point, to the east side of the buoy at N.N.E. ¼ E. one mile from the point, passing a cable West of the intermediate red buoy.

DIRECTIONS.—After rounding the south-east extreme of cape Wollamai, haul in for Red point, passing it within a cable, until it bears S.W., when, if desired, a vessel may anchor in 3½ fathoms between it and the first black beacon. From the outer anchorage pass midway between the beacon and the eastern bank, where the channel is only 50 or 60 yards wide, and then steer N.W. half a mile, keeping the white beacon on the starboard bow; give it a berth of half a cable; and if not intending to anchor in the channel, follow its course to the northward and north-eastward, leaving the white buoy on the starboard, and the black beacons on the port hand. From the Narrows steer N.N.E. ¼ E., leaving the black beacons and buoy on the port, and the intermediate red buoy on the starboard hand, and having cleared the channel, the vessel may proceed according to her destination.

Caution.—Vessels of 12 feet draught, bound into port Western by the East entrance, should wait in the inner anchorage till nearly slack water as the stream runs with great force through the Narrows.

From Port Western out to Sea.—From the east side of the buoy at N.N.E. ¼ E. of Woody point, steer S.S.W. ¼ W. through the Narrows, leaving the intermediate red buoy on the port, and the black beacons on the starboard hand, leave the white buoy and white beacon on the port hand, and then steer about S.E. by E. out to sea, passing the southernmost black beacon on the starboard side.

The chart and lead are the best guides for this entrance.

Anchorage.—From a depth of 8 fathoms off the south-east extreme of cape Wollamai the soundings decrease gradually towards the East entrance, close within which is the outer anchorage, in 3 to 4 fathoms, sand, between Red point and the first black beacon. Vessels drawing 18 feet, seeking shelter, and unable to fetch the West entrance, need not lose ground by running back eastward, round Wilson promontory, but may find anchorage within the entrance, at a quarter of a mile inside Red point, sheltered from all winds except south-east gales. Vessels of 12 feet draught may bring up in the inner anchorage, between the first black beacon and the Narrows, in 15 to 20 feet water, sand and mud. The most convenient anchorage is between the white buoy and Davis point, where the channel, being widest, affords more room for getting under way. As the streams run through the channel with great force, it advisable for vessels at anchor to lay out a kedge to keep them from fouling their anchors.

East Shore of Port Western.—From Davis point the shore forms a bay extending N.N.E. 3¾ miles to Reef islet, which is surrounded with rocks, that also connect it with the low north-east point of the bay. This bay is nearly 2 miles deep ; but it is shallow throughout, there being only 6 to 12 feet water across its entrance from point to point.

Maggie Shoal.—The bank which mostly fills the bay, projects to a 4-feet spit, close off which is Maggie shoal, with a white buoy on it, lying N.E. by N. 2 miles from Davis point.

Bass River is a small stream winding through the low marshy land into the bay at E. ¾ N. 2 miles from Maggie shoal.

Between Reef islet and Settlement point, at North 3¾ miles from it, the eastern shore of port Western is divided into two small bays of nearly equal extent, by Cobb bluff, from which a reef projects about a quarter of a mile.

Soundings.—With the exception of the northern branch of the East arm and the bight between Observation point and the spit northward of it, the whole of the eastern part of point Western is filled by a flat, with rarely more than 3 fathoms water over any part of it.

Aspect.—The mainland about the eastern end of port Western is moderately elevated and thinly wooded with short trees ; the soil is rich, especially near the banks of Bass river, and is clothed with coarse grass to the water's edge. From the hilly promontory forming the east side of the East entrance, a range of wooded hills stretches away in an East and N.E. direction, River hill, one of the summits which is 816 feet high, bearing N.E. ¾ E., distant 10 miles from cape Wollamai.

TIDES.—It is high water, full and change, at Spit point, French island, at 1 h. ; springs rise 10 feet, and neaps 8 feet, the latter ranging

6½ feet: at Bourchier channel, north of French island, at 1 h. 13 m.; springs rise 10¾ feet, and neaps 8¾ feet, the latter ranging 7½ feet: at Mussel rock, north side of Phillip island, at 0 h. 12 m.; springs rise 8½ feet, and neaps 6½ feet. At Woody point at 0 h. 50 m.; springs rise about 8 feet, and neaps 5 feet.

The stream in the main channel, between Phillip island and Middle bank, runs 3 knots, and in the East arm one to 2 knots.

THE COAST* from Griffith point, which is N. by E. ½ E., 2 miles from cape Wollamai, forms a slight curve trending E. ¼ S. 4½ miles to Black head, and thence south-easterly 3 miles to Powlett river, continuing on in the same direction for a further distance of 5 miles to Coal point, occupied by the Victoria Coal Company. The mines are not being worked.

Coal Point has numerous sunken rocks off it at the distance of a mile southward of the point; one rock uncovers at low-water spring tides. The heavy break shows the point to be dangerous of approach.

From Coal point the land takes a S.E. by E. ½ E. direction to cape Patterson, from which it is distant 2¼ miles. The whole coast south-east of Black head is little more than a succession of sandy hillocks, from 100 to 144 feet high, covered in most places with dwarfed tea trees, but occasionally bare.

CAPE PATTERSON is an ill-defined point, rounded and low; and the least conspicuous point along the whole coast; the highest part within a mile of the point is 127 feet above the sea, and this elevation scarcely increases until it joins a range of hills over 900 feet high to the east and north-east of River hill, at a distance of 11 miles from the cape.

There is nothing to point out cape Patterson. A conspicuous rock 59 feet high, about 3 miles to the eastward of the cape, known as the Eagle's Nest, lying half a cable off the coast at its turn towards Anderson inlet, serves to distinguish it. About this place East and West the coast has a cliffy appearance.

Reef.—A reef, dry at low water, extends 3 cables in a south-east direction from cape Patterson, and 3 fathoms will be found 4 cables S. by E.

The COAST from cape Patterson trends 2 miles in an E. by N. direction, and thence N.E. 4 miles to the mouth of Anderson inlet.

Anderson Inlet, which by its two streams, Tarwin river and Screw creek, drains about 300 square miles of country, is not navigable except for flat-bottomed boats or barges, but there is depth of water in patches sufficient to allow the vessels which enter to anchor.

The bight formed about the mouth of Anderson inlet is known as Venus bay, but it does not afford good anchorage.

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* *See* Admiralty charts:—Bass strait, Nos. 1,695 a and 1,695 b; scale, $m = 0 \cdot 20$ of an inch; Australia, General chart, Southern portion, No. 2,759 b.

Petril Rock, only 2 feet above high water, lies nearly half a mile from the shore, about midway between Eagle's Nest and the mouth of Anderson inlet.

TIDES.—It is high water, full and change, in Venus bay, at 11 h. 56 m.; range of tide about 7 feet.

The COAST.—From Smythe point, the east entrance point of Anderson inlet, the coast trends south-east 13 miles with a slight curve to Watercress creek; all this coast being a succession of sand-hills 110 to 160 feet in height, their faces for the last 5 miles being comparatively destitute of verdure.

Watercress creek (so named from the abundance of that plant) is at the foot of the table land of cape Liptrap. On the coast, three-quarters of a mile north-west of the mouth of Watercress creek, is a small rock of sandstone 15 feet above high water, and from this to a distance of 4 cables seaward are several sunken rocks. The coast line here is composed of low sandstone cliffs.

For one mile S. by E. ½ E. from Watercress creek is a very rugged piece of coast, and point of overhanging sandstone, with jagged and pointed rocks strewed along the shore.

Off the northern portion of this rugged coast, and at the distance of 2 cables, lies Arch rock, 82 feet high, having a natural arch on its eastern side. It has a rock awash at half-tide lying a cable to the W.S.W. The same character of coast continues for a mile beyond Arch rock in a S.E. by S. direction, having innumerable pinnacle rocks of various heights strewn along the whole distance, with other outlying sunken and half-tide rocks, in some places nearly half a mile from the shore. Off this piece of coast craw-fish abound.

Hence, the land trends in a S.S.E. direction 3 miles to a conspicuous islet, 63 feet high, off the western part of cape Liptrap. Half this distance being a straight piece of sandy coast, with the table land of cape Liptrap getting nearer as the coast runs southward. The whole has outlying sunken rocks about 3 cables from the shore. From the islet the coast forms three small bays to the cape.

CAPE LIPTRAP, which is nearly perpendicular, and 297 feet high, forms the south-west extremity of a table-topped promontory 550 feet high, joining the base of the Hoddle range of hills, which are 968 feet above the sea; at 16 miles N.E. by N. from the cape, these again join the Fatigue mountain range, the highest part of which is above 2,000 feet high.

Several outlying rocks, varying in height from 5 to 30 feet, partially fringe the coast southward and eastward of cape Liptrap, but none extend more than 2 cables from the shore.

The COAST.—From cape Liptrap the land forms a bight to Grinder point, which is 2 miles N.E. by E. ½ E. from the cape. This bight is fringed with low water and sunken rocks, which in some places extend 3 cables from the shore, and farther out even than this in bad weather the sea breaks violently.

From Grinder point the land takes a north-easterly direction for a further distance of 2¼ miles to Bell point, and a similar description of coast to the last is found, with the exception that the land is somewhat lower, and a number of rocks from 10 to 30 feet high are found at short distances from the shore.

Bell Point may be known by a large broad-topped rock about 40 feet high, and a cable from the shore. From this point the land takes an abrupt turn into Waratah bay, trending about N.N.W. for 2 miles. At 3 cables from Bell point is a small islet 60 feet high, and about the distance of one mile are the Bird rocks, three in number, and from 40 to 60 feet high, the outer rock being 2 cables from the shore. These rocks will be a guide to mariners using the bay, enabling them to ascertain their position.

WARATAH BAY affords good anchorage. In the depth of the bay, at 4 miles from Bell point, the coast line falls to a height of only 100 feet, when the ordinary feature of sand-hills, generally covered with tea tree, is again met with.

Light.—A harbour light is exhibited from a lamp-post on the shore in Waratah bay, bearing W.S.W. from Bird rocks, distant 2 cables.

The light is a *fixed red* light, elevated about 120 feet above the sea, and should be visible in clear weather from a distance of about 3 miles.

Anchorage.—Vessels entering Waratah bay, will find anchorage in 6 fathoms water, with the light bearing S.W. distant 7 cables.

Vessels may anchor in good holding ground more than a mile from the shore during south-westerly gales, and in the event of the wind chopping round to the eastward they will have plenty of room for working out.

Shallow Inlet.—From Waratah bay the coast trends E.S.E. until within 2 miles of the entrance to Shallow inlet, when its features are altered to a low, bare, sandy shore, scarcely above high water. The east entrance point of this shallow inlet or lagoon is much higher, but is likewise of bare sand. It was not found possible to sound the entrance of the inlet on account of the heavy break; but the depth varies with the prevailing winds and freshets, being occasionally dry at low water, and at other times having sufficient water for a large boat to enter.

From the mouth of this inlet the land trends with a slight curve in a S.E. ¼ S. direction for nearly 6 miles to Black rock, which is about 30 feet high, and a cable from the coast.

From a position 4 miles north-west of Shallow inlet to about a mile from Black rock, shoal water with a sandy bottom will be found extending about half a mile from the shore, and off the inlet this shoal water runs out nearly a mile. About 1½ miles to the northward, and 2½ miles to the southward of Black rock, the sandy bottom is interspersed with rocks, some of which uncover at low water.

Shellback Island.*—About 1½ miles S.W. of Black rock lies Shellback island, 357 feet high; it is the northernmost of the islands on the west coast of Wilson promontory.

Tongue Point, 167 feet high, lies S. ½ E. 2½ miles from Black rock, the coast between forming a deep bight, in the depth of which are a few low red cliffs, but they are not conspicuous. Tongue point has a remarkable conical white rock, 30 feet high, close off it to seaward. Abreast of it at the distance of a mile, the shore is high, and rises at a distance of 4 miles to parts of the promontory range, which are here about 2,000 feet above the level of the sea. Mount Vereker, the N.W. mountain of the promontory, bearing N.E. by E. 6 miles from Tongue point, is 2,092 feet high, and has a spur, 1,654 feet high, running N.W. about 2 miles from it; this spur gradually falls in a westerly direction, and forms the north-west termination of the high land of the promontory.

From Tongue point the land trends S.E. ½ E., forming a deep bight to Leonard point, southward of which and on the same bearing are Pillar and Norman points, forming the southern sides of Leonard and Norman bays.

NORMAN ISLAND lies a little more than a mile south of Tongue point, and may be known by its two peaks, the higher and northern of which is 316 feet high.

Anchorage.—At one and 2 cables off this island on its eastern side are 9 and 11 fathoms of water, where, in the course of the survey, it was often found convenient to drop the anchor during a prevalence of south-easterly winds. Coasting steam vessels of little power bound to the westward, having rounded the promontory and being met by a south-westerly gale, might find it convenient to anchor here in preference to running back again, and anchoring in Waterloo bay, to the eastward of the promontory.

OBERON BAY, lying southward of Norman point, is the largest of the three bays on this piece of coast, and affords the best anchorage. The bay is a mile deep, 1½ miles across, and has a broad sandy beach upon which the sea breaks heavily. Landing can in general only be effected in the south-easterly corner. From the prevalence of south-westerly winds none of these bays can be recommended as anchorages for other than steam vessels.

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* *See* Admiralty chart, Wilson promontory, with Corner inlet and port Albert, No. 1,703; scale, $m = 1$ inch.

H.M.S. *Basilisk* anchored in June, 1871, in Oberon bay, is 7 fathoms, mud, with the North point bearing N.N.W. ½ W., and the South point S.W., and found good shelter during a heavy gale from the eastward which lasted three days.

Caution.—From present experience of this locality easterly gales appear to die away at East or N.E., but a south-westerly gale may spring up with scarcely any notice of its approach, when sailing vessels would find themselves on a lee shore with a swell setting them dead to leeward.

The COAST from the south-west point of Oberon bay, trends for a mile in a S. by E. direction, and then gradually takes a more easterly turn to a moderately deep bight, whence it again runs S. by E. to South-west point. All this coast is bold and cliffy, the cliffs in some places being several hundred feet in height, and rising again at the back towards the mountain land of the promontory.

Off South-west point, at the distance of a long mile S.W. ¾ S., is Anser island, the largest island of the group of the same name.

GLENNIE GROUP consists of four islands, which lie about 4 miles W. ½ S. to S.W. ½ W. from Oberon point, the nearest land of Wilson promontory.

Glennie island, the largest of their number, is 455 feet high, nearly 2 miles long, N.W. by N. and S.E. by S., saddle-shaped, and strewn over with blocks of granite (of which it is composed), and which gives it a castellated appearance. A rock 3 feet high, over which the sea generally breaks heavily, lies about 2 cables North of its northern extreme, and another somewhat larger, 15 feet high, lies about a cable off its north-east end. Three smaller islands lie off the south point of Glennie island ; the southernmost has been named Citadel island, from its resemblance to an ancient fortress.

ANSER GROUP of three islands, apparently takes its name from the numerous geese frequenting them. Anser island is the highest, and rises to a nipple point, 498 feet above the level of the sea ; it is cliffy in all directions, but least so to the northward, where landing may often be effected.

Cleft Island, the most remarkable of this group, lies nearly 1½ miles S.W. from Anser island. It is of a round form, and may be known from having a large slice out of its north-west side, which gives it a cavern-like appearance ; it is also perpendicular, and white on all sides.

Two small islets, between 40 and 50 feet high, lie between it and the next or middle island of this group, equally dividing the distance between them. A third islet not quite so high lies a cable of the north-west point of the middle island, which is 312 feet high.

There is deep water between the Anser and Glennie groups as also between them and the shore. The whole of the coast adjacent to the islands is bold, and all dangers are visible.

Seals inhabit these rocks and islands.

Tides.—It is high water, full and change, in Waratah bay, at noon; springs rise, 8 feet; at the Glennie islands, at 11 h. 44 m.; springs rise, about 9 feet.

The COAST.—From South-west point the land runs E. by S. ½ S. 1½ miles to a projecting low and stony point, the southernmost point of Australia, off which, at a distance of one cable W.S.W., is a rock 15 feet high, and in the same direction at a further distance of 2 cables is Wattle island, 270 feet high, which from being so close to the shore appears connected, but between the island and the 15-feet rock just spoken of is a deep channel through which a strong tide constantly sets. A rock awash lies nearly a cable S.W. of the west point of Wattle island, but with this exception the coast is bold.

Half a mile from South-west point a freshwater creek discharges itself, and at a short distance inland, and eastward of this, is a remarkable stone near the summit of the coast range, which closely resembles a tower.

From the low and stony point the coast trends in a generally E. by N. ½ N. direction to the promontory lighthouse, which is distant from it 2½ miles; but in this distance there are two deep bights, the westernmost running more than half a mile up into the land, and forming at its termination a natural basin where there is a running stream.

From South-west point to the lighthouse on South-east point the land rises suddenly from the water's edge to an elevation of nearly 1,000 feet.

From Wilson promontory lighthouse the land trends N. ¾ E. 2½ miles to Waterloo point, the south-west point of Waterloo bay. At one mile in that direction is a point with a small islet off it, but almost connected with the shore by large boulders; the islet does not extend beyond the line of the shore, and immediately northward is an indentation half a mile deep.

Soundings.—From 31 fathoms at 4 miles off cape Liptrap to 42 fathoms at 9 miles W.S.W. of Cleft isle, there is no bottom at 35 and 43 fathoms.

WILSON PROMONTORY,* the south extremity of Australia, is a lofty peninsula, 22 miles long, North and South, and 8 miles broad at the centre. It is connected with the mainland to the north-westward, by a low sandy neck 10 miles long and 3 to 5 miles broad, which separates

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* *See* Admiralty chart:—Wilson promontory, No. 1,703; scale, $m = 1$ inch.

Waratah bay from Corner basin, to the north-eastward. This promontory rises to rugged mountains, some of which are above 2,000 feet in height, thickly wooded on their upper and less exposed parts; but towards the shore they are nearly destitute of vegetation, and descend abruptly to the sea. The soil is shallow and generally barren; though the brushwood, dwarf gum trees, and some smaller vegetation, which mostly cover the granite rocks, give the country a deceitful appearance to the eye of a distant observer.

LIGHT.—The lighthouse which stands on the south-east point of Wilson promontory, E. by N. ½ N. 2¼ miles from the south point, is a white circular stone tower, 70 feet high, exhibiting at the height of 383 feet above the level of the sea a *fixed* white light visible in clear weather 24 miles. This light is seen between the bearings of N.E. by E. ½ E. and S.S.W., and a ray is visible between the islands of Anser group, on an E.N.E. bearing.

Bound from the westward and making the light, it may be steered for, as all the islands are steep-to.

Landing.—Except when the wind is directly from the southward and fresh, a landing may be effected on one or other side of the lighthouse point, with or without the aid of a crane, which is placed specially for landing stores. The first distinguishing pendant denotes that there is landing on the east side, the second distinguishing pendant that there is landing on the west side, and number 5 red flag that there is no landing.

Forty-foot Rocks (formerly Ten-foot rocks) lie S. ½ E. 4¼ miles from the lighthouse. Captain Kay, R.N., landed on these rocks (not to be attempted once in a year), and thus describes them:—

"Forty-foot rocks consist of three separate and distinct islets of granite, of which the largest or westernmost was ascertained to be 165 feet long, with a breadth of 50 feet at the broadest part near its centre; this islet is 20 feet high, and on its southernmost extremity there is a granite boulder, 20 additional feet in height, and 40 feet above high-water mark, which, when the sea is breaking over these rocks, is probably the only part of them then visible." These rocks are steep-to in all directions.

RODONDO ISLAND, S. ¾ W. 6 miles from the lighthouse on Wilson promontory, is a conspicuous conical mass of granite, three-quarters of a mile in extent, rising to a distinct peak 1,150 feet above the sea, and visible in clear weather at 30 miles. It has high cliffs on all sides, the surface above being covered with a dense dwarf scrub, and is steep-to in all directions. The Forty-foot rocks lie N.N.E. ¾ E. 2 miles from Rodondo, and between there is a deep channel of 38 fathoms.

Moncœur Islands.—East and West Moncœur islands, 1½ miles apart, 331 and 318 feet high, lie nearly in line E. by N. from Rodondo island, at 5 miles and 6½ miles respectively from it; and S.E. ½ S. 7 miles, and S.E. ½ E. 7¾ miles from the lighthouse on Wilson promontory. The West island is nearly half a mile long North and South, and about 200 yards wide; with a small islet at half a cable South of it. The East island is one-third of a mile long N. by W. and S. by E., and rather more than 200 yards wide. They are bold-to.

TIDES.—Off Wilson promontory the tides as a general rule set E.N.E. and W.S.W., the flood stream coming from the eastward. The turn of the stream happens at nearly the same time as high or low water by the shore, but the direction of the stream is much influenced by the winds. Near the promontory, after an easterly gale, the ebb stream which has been checked during the gale continues to run to the eastward when the flood should have made; and at the strength of the flood the combined streams will be found setting to the northward, except inshore, where the tidal streams follow their general law. In like manner a south-westerly gale has an opposite effect.

The velocity of the tides off the promontory (where they run the strongest) was never found to exceed 2½ knots. Along shore and to a distance in the offing of 7 or 8 miles from the promontory to cape Wollamai the tides are scarcely felt, but run with their greatest strength off the several points. During and after heavy easterly and westerly weather a current will be found setting in the direction of the wind which is blowing, or has just ceased to blow.

Soundings.—Off Wilson promontory the soundings afford little guide, but either in the bight between Norman island and cape Liptrap, or off cape Liptrap, a depth of 30 fathoms will ensure a vessel's being 3 miles off shore. This depth will likewise ensure this distance from the land all along the coast to near cape Wollamai.

To the southward and south-westward of cape Patterson the soundings shoal much more gradually than on any other part of this coast, and 30 fathoms or less will be found 6 miles off shore. From thence westward the 30 fathom line again nears the coast until off cape Wollamai where it is distant only 1½ miles.

WATERLOO BAY, extending from Waterloo point N.E. 2½ miles to cape Wellington, is 1⅓ miles deep, with 14 fathoms, sand, in the centre, whence the depth of water decreases gradually to 6 fathoms at 2 cables from the shore, but increases towards the outer points. Waterloo bay, being so immediately under the high land of Wilson promontory, and exposed to swells from both sides of Bass strait, is not recommended as an anchorage for sailing vessels.

The soundings are very uneven after passing the reefs at the entrance, and shoal patches of 12 and 13 feet exist at low water, with rocky bottom all over the bay.

The western shore of Waterloo bay forms the eastern end of a low valley 3 miles long, which stretches across the promontory to Oberon bay. The valley makes a conspicuous break in the high land which divides the boulder range from mount Wilson.

Moorings for four vessels are laid down in Waterloo bay, the outer two in 27 feet at low water, and the inner two in 11 feet.

Anchorage.—The best anchorage is about 4 cables from the south-west shore in about 12 fathoms water. Steam vessels bound westward met by a south-westerly gale may anchor close in to the land in a small cove under Waterloo point.*

CAPE WELLINGTON, a hilly headland 442 feet above the sea, forming the north-east point of Waterloo bay, projects 1¼ miles S.E. from the line of the coast; Kersop peak, its most elevated summit, rises to a height of 729 feet, a mile N.W. of the cape.

The bold eastern face of cape Wellington extends N. by E. half a mile from its south extreme, thence the land trends N.N.W. ½ W. one mile to Brown head, with a cove midway lying in a southerly direction.

Mount Wilson, on the north side of the valley and 3½ miles West of cape Wellington, rises abruptly from the southward until its wooded summit reaches the height of 2,320 feet. It is the second highest mountain on the promontory. On the south side of the valley opposite mount Wilson is a mountainous range known as Boulder range, which at its highest part rises to an elevation of 1,725 feet. The whole mountainous range on Wilson promontory is of granite, with immense boulders generally visible, but more particularly on the part known as Boulder range.

Mount La Trobe, which reaches an elevation of 2,434 feet, lies N.N.W. ¾ W. 3½ miles from mount Wilson; having nearly midway between mount Ramsay 2,313 feet high.

REFUGE COVE, half a mile W.N.W. from Brown head, and the only anchorage on this side of Wilson promontory sheltered from the eastward (unless Corner basin and Bentley harbour are considered exceptions), is the central of three small deep-water bights between Brown head and Horn point, which latter lies a mile N. by W. from the head. Hobbs head, half a mile to the southward of Horn point, forms the north side of the entrance to Refuge cove, which is only 1½ cables wide.†

The cove may be easily recognised from being distant midway between Kersop peak and Horn point, and from its having the first sandy beach which opens north of cape Wellington. It is about one-third of a mile in extent with 8 fathoms in the entrance, from which the depth gradually decreases to 3 and 4 fathoms, in most places close to the shore, but near the sandy beaches at half a cable.

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* H.M.S. *Wolverene* in 1877 took shelter in Waterloo bay during a heavy gale from West to S.W., which lasted from the 1st to 5th of November, and found the holding ground to be good.—Remark Book, Navigating Lieutenant W. J. Symons.

† *See* Admiralty plan of Refuge cove, on sheet 1,695 b; scale, $m = 1 \cdot 25$ inch.

Vessels making use of the cove should anchor in the south part. Refuge cove is not much used owing to the difficulty of getting out, the high hills around almost completely screening it from any winds off the land.

The cove between Brown head and Refuge cove trends one-third of a mile to the southward with 9 to 4 fathoms; that between Hobbs head and Horn point has the same depth of water, but is open to the eastward.

TIDES.—It is high water, full and change, in Refuge cove, at 0h. 5m.; springs rise, 8 feet.

Off cape Wellington the tidal streams appear to meet and run in opposite directions, one portion of the flood stream which comes from the north-eastward turning and running along the shore to the northward, the outer portion of the same stream continuing its course round the promontory to the westward. The ebb stream acts in an opposite manner.

SEALERS COVE.—From Horn point, a cable off which N.W. by N. there is a 9-feet rock, the coast trends W. by N. ½ N. for three-quarters of a mile, and then West for another three-quarters of a mile to the southern point of Sealers cove, which is nearly three-quarters of a mile wide N.N.W. and S.S.E. at its entrance, and about one mile in extent within. There are depths of 4 and 5 fathoms at the entrance, within which the water shoals gradually, the 3-fathoms line only being 1½ cables inside. A heavy swell often rolls into Sealers cove.

Water.—Fresh water may be obtained either in Refuge or Sealers cove, but in the latter it might be necessary to go some distance up the creek in the south-east corner. At Refuge cove water may be obtained with greater facility, principally in the south-west corner of the northern sandy beach.

Five-mile Beach.—From the north shore of Sealers cove the coast trends northerly and north-westerly 1½ miles to the south end of the Five-mile beach, and thence extends with a slight curve N. by E. ¼ E. 4½ miles, being intersected at each end by a stream of fresh water. The beach may be approached to two-thirds of a mile in 5 and 6½ fathoms. At the back of this beach is flat swampy ground, which extends for 1½ and 2½ miles until met by the slopes of mount Vereker.

At the north end of Five-mile beach the higher part of the promontory again approaches the shore, forming a small point from which in a north-easterly direction about half a mile is another point abreast of Rabbit island. This is the easternmost point of the promontory; and off it in a S.S.E. direction is a rock which, from its resemblance to the island of the same name, has been named Rabbit rock; this rock is 50 feet high, and has a small detached rock close-to on its west side.

RABBIT ISLAND, so named from the number of rabbits upon it, lies East three-quarters of a mile from the east point of Wilson promontory. It is nearly half a mile long N.E. and S.W., and being 194 feet high, is an excellent mark for vessels proceeding northward to Corner inlet.

Anchorage.—There is good anchorage in all but south-easterly or easterly gales in 4½ and 5 fathoms one mile N.E. of Rabbit island. Traders bound to the westward will find it convenient to anchor here during south-westerly gales. Small craft bound westward during westerly gales often anchor near Rabbit island, but in a seaworthy vessel such a place is not to be adopted, unless the gale is of unusual violence.

Wood and Water may also be obtained at this anchorage; the water will be found in the little sandy valley on Rabbit island by sinking a cask, and the wood may be obtained on the adjacent mainland, or wood and water may both be obtained on the mainland.

TIDES.—It is high water, full and change, at Rabbit island at 0h. 14m.; springs rise 8 feet.

The COAST.—From the point abreast Rabbit island the coast trends N. by W. one mile to a point behind which are two good fresh-water streams. At a further distance of half a mile in the same direction is another small point, whence the land trends in a westerly direction for half a mile, and then N. ½ W. 2 miles to a point at the south-east base of mount Hunter, and thence again in the same direction to a smaller point East of the same mount, whence the coast, which then becomes low and sandy, still trends N. ½ W. about 2 miles to Entrance point, at the entrance to Corner basin. Between the several points here spoken of are sandy beaches.

Abreast of Rabbit island and to the northward of Five-mile beach the hill over the coast rises to an elevation of 778 feet; and N.N.W. ½ W. 1½ miles from this, and nearly a mile from the coast, is mount Roundback, 1,050 feet high. At 3½ miles N. by W. of mount Roundback and one mile from the coast is mount Hunter, 1,175 feet high, which is conspicuous being of a pyramidal shape and the northern high hill of the promontory.

Between mounts Roundback and Hunter the range falls considerably, but about midway is a wedge-shaped hill 716 feet high. At 2½ miles N. by W. ½ W. of mount Hunter, and on the northernmost point of the promontory, is a hill 480 feet high locally known as mount Singapore; this hill forms a useful leading mark into Bentley harbour. At the foot of mount Singapore is Entrance point, the southern point of Corner inlet.

SEAL or DIRECTION Islands.—About 7 miles E. ½ N. of Rabbit island is the largest of the Seal islands. The group consists of four small islands and three rocks, which latter extend in a north-westerly direction from the northernmost and largest island. The largest of the rocks, White rock, is 33 feet high, and distant from Seal island 1½ miles. One other rock is adjacent to Seal island, and nearly midway between is a rock 8 feet above high water, with a rock awash off it to the northward.

Seal island, the largest island of the group, is 154 feet high and about a mile round, being covered with tufts of coarse grass, among which are the burrows of penguins and mutton-birds.

Notch island, the second largest, is 123 feet high, and lies one mile S.E. from Seal island; it has two hills upon it, and the valley between giving it a notched appearance has caused it to be named Notch island.

Nearly one mile S.S.E. from Notch island is Rag island, 94 feet high; and E. by S. 1½ miles is Cliffy island, 144 feet high.

With the exception of rocks awash a cable off the west side of Rag island, a rock awash one cable off the north-east part of Cliffy island, and the rocks mentioned as lying off Seal island to the north-westward, the islands are all steep-to.

Cliffy island.—Light.—From a lighthouse, 25 feet high, situated on the southern side of Cliffy island a light is exhibited. The light is a flashing *red* light, showing *five flashes and eclipses* alternately *every minute*; it is elevated 180 feet above the sea, and should be visible in clear weather from a distance of 15 miles.

CORNER INLET, lying between Entrance point and La Trobe island, is the entrance to Corner basin, an extensive sheet of water between Wilson promontory and the land to the northward, with deep channels leading between its numerous mud-flats. The inlet is fronted by a bar (which is 2 miles across), the deepest water over which at low water is 22 feet. Within the bar S.E. by E. ½ E. 4 miles from Entrance point, there is 5½ fathoms of water. Here the channel is more than a mile wide, decreasing to half a mile between Entrance point and La Trobe island; having crossed the bar the depths in the channel gradually increase, until nearly abreast of Entrance point, when 18 and 19 fathoms is obtained.

Buoys.—There are two black buoys moored on the southern side of Corner inlet, the outer lies in 5 fathoms S.E. by E., 3½ miles, and the other in 3½ fathoms S.E. by E. ½ E., one mile from Entrance point.

There is also a black buoy moored in 10 feet water off the point of La Trobe island, immediately opposite Entrance point; this buoy is for vessels making use of Bentley harbour.

No good mark can be given for entering the inlet. The chart and lead are the best guides; no stranger, however, should attempt to enter Corner inlet without a pilot.

Corner Inlet Sand-banks.—The coast of the promontory North of Rabbit island is fronted by an extensive shoal sand-bank, which since Commander Stokes' survey of 1842 appears to have greatly extended. The south-east extremity of the shoal with 17 feet water lies N.E. ¾ N. 3 miles from Rabbit island, and its inner part trends thence westward to the shore, leaving 3½ and 4 fathoms between it and Rabbit island, as well as in a gully between it and the land. A line drawn from Rabbit island to the bar entrance to port Albert passes over the seaward and south-easternmost extremity of the banks extending from Corner basin.

The South point of entrance of Corner inlet channel is on this line, N.E. by N. 5 miles from Rabbit island. The 3-fathoms line forming the edge of the southern bank turns from this point W. by S. for 2 miles, when it trends with a northerly curve N.W. ½ W. 4½ miles to Entrance point.

The northern banks of Corner inlet extend from the point of La Trobe island, opposite Entrance point, in a S.E. by E. direction for 6 miles, then curving to the westward for more than a mile, in about 12 feet, at low water. The deepest channel to Corner inlet lies between these banks, and is about half a mile wide, with 22 feet at low water.

The outer parts of the northern banks just described trend to the north-westward for about 2 miles, and then in a westerly direction for a mile to Townsend point, where they approach the land to one-third of a mile and form the southern side of the channel into Bentley harbour.

Clearing Mark.—Mount La Trobe, open south of Rabbit island, S.W. ¼ S., leads a quarter of a mile south-eastward of the banks.

CORNER BASIN extends 4 miles North and South, and 14 miles from Entrance point to the north-west corner of the basin, into which flows Tarwin rivulet. The northern and south-eastern shores are fronted by swampy mangrove islands, and the basin is mostly filled by mud-banks.

BENTLEY HARBOUR.—Vessels wishing to anchor during the continuance of strong easterly or south-easterly gales may anchor in Bentley harbour, which, as already described, lies between La Trobe island and the northern banks of the inlet; they will there be protected from all winds, and have a strong ebb tide to assist them in getting out again. Bentley harbour is protected to the southward by a sand-bank which dries at low water. The pilot stationed at port Albert often takes vessels through Bentley harbour into Corner basin.

Leading Mark.—A good leading mark in is mount Singapore open of Townsend point, the southern point of La Trobe island, W. ½ S. When abreast of Townsend point keep along the shore and anchor as convenient.

Pilots are always on the look out at port Albert, and will come off at any time.

Caution.—The commanders of vessels are recommended to avail themselves of their services, and not to attempt to enter either Corner inlet or port Albert without local knowledge.

La Trobe Island, which lies between Corner basin and port Albert entrance, extends from the point abreast Entrance point, E. by S. 2½ miles to Townsend point, and thence with a curve inwards N.E. ¼ E. 4 miles to port Albert lighthouse, now disused, which is situated nearly a mile from the east point of the island. La Trobe island is low, but the trees on it give it an elevation of 40 to 60 feet.

Clonmel Island is the narrow sandy island, only 14 feet high, which forms the east side of the entrance to port Albert. It extends N.N.E. ¾ E. 2½ miles to an entrance known as Kate Kearney channel, which always breaks across, and probably has its outside bar above low-water mark. There is a signal staff on the north-west part of the island.

PORT ALBERT.—The entrance to port Albert is over a mile wide between the east point of La Trobe island and Clonmel island on the opposite side. But this entrance is divided by a large bank of sand, which extends from midway between these two islands for nearly 2 miles in a southerly direction.

On this large bank of sand there are two parts which form islands, one being elevated 3 and the other 2 feet above high water. From the north point this sand-bank also extends in a south-westerly direction for one mile, with a small detached sand-bank off its south-west extreme.

The population of port Albert was, in 1881, 300, of Alberton, on the east bank of the river Albert, 4 miles distant, and the surrounding district, it was about 3,000. Port Albert is one of the principal fishing grounds in the colony. Its exports are wattle bark, leather, raw hides, and grain. There is communication with Melbourne by rail to Sale, and thence coach to the port; also telegraphic communication with the Australian colonies and Tasmania. Also regular steam communication with Melbourne. Port Albert has monopolised the trade of the district, which is not large.

There is a wharf with 6 feet at low water, but vessels drawing 10 feet can lie alongside it, as the bottom is all soft mud.

A Life-boat is stationed at the town of port Albert, 4 miles from the entrance.

Snake Channel.—The north-west side of the bank described forms the south-east side of a very narrow channel running close along the shore of La Trobe island, with 5 feet water generally at its shoalest part. This is known as Snake channel. It is marked by two red cask buoys.

Main Channel.—From the south-east part of Clonmel island (so called from the wreck of the steamer of that name) another sand-bank extends in a southerly direction for more than a mile. It is between this bank and the one extending from mid-entrance that the main channel into port Albert lies, and from the tails of these banks breakers extend in a south-easterly and southerly direction, those to the eastward extending nearly a mile, and those to the westward half a mile.

The Bar of port Albert is strictly speaking only navigable for vessels drawing 9 feet water. The surveying steam vessel *Pharos* crossed it drawing 10 ft. 6 in., but it was the fine-weather season, and it was intended to remain inside for a week. Vessels of heavy draught would run the risk of being detained inside either for high tides or smooth water.

Though the general feature of the bar of port Albert remains the same yet in so far as the navigation is concerned it is continually shifting.

A body of sand appears to be perpetually driving from the east to the west side of the channel, but more particularly during strong breezes from east or south-east. The tide out of the port is considered, however, to keep a channel across the bar of 5 feet at low water, though it may be doubted whether at all times even this depth is maintained.

Bar Buoys.—There are two buoys on port Albert bar. One red, on the south extremity of the eastern bank, moored in 17 feet of water, the other black, 3 cables to the northward on the west side of the channel in 5 or 6 feet of water. This latter buoy requires constant shifting, and cannot be relied on as being in its true position. In addition to the above, wreck buoys are sometimes moored in the channel over wrecks which interfere with shipping.

Inside the bar the depth increases rather suddenly; at half a mile from the black buoy there are 5 fathoms, and when abreast of the south point of Clonmel island there will be from 8 to 11 fathoms. About one-third of a mile N.W. ½ W. of this point is a black buoy which is moored on the tail of a spit extending in a S. by W. direction from the east point of Sunday island.

Within the entrance there are two channels, the deeper one sweeping round westward, northward, and north-eastward for 7 miles; and the other northward and westward for 5 miles, when they re-unite at a point N. ½ W. 4 miles from the now disused lighthouse. The western trend is called the Midge channel. The space enclosed by these channels is occupied by Sunday and a few smaller islands separated at low water by mud-banks. Sunday island is mostly covered with tea trees, the highest being about 41 feet above high water. It is surrounded by mud flats.

The Eastern Channel, from its commencement at the black buoy off Clonmel island, is from one to 2 cables wide; it extends in a northerly direction for nearly 3 miles, when it forms two branches, the one to the westward being the Midge channel, already spoken of, and the other, which trends in a N.N.E. direction, and leads to the township of port Albert, 7 miles from the bar. From the junction the town is distant nearly 2 miles. The channel from the black buoy at the entrance is well marked by wooden piles on either side, those on the port hand being painted black, and those on the starboard hand red. In the channel, until its turn to the N.N.E., from 15 to 25 feet will be found, and thence to the township 15 to 6 feet, which latter depth is also the depth at the wharf, though 10 feet at low water will be found in the stream. The shoalest water in the channel is about 2 cables from the wharf. The channel runs between numerous low islands, generally mangrove, with other smaller channels between them, mostly dry at low water.

The continuation of the eastern channel is known as the river Tarra Tarra, upon which, at 2 miles from the town of port Albert in a straight line, is the township of Tarraville.

Tarraville is a small township on the left bank of the Tarra, near its mouth. Small vessels can get up to it at high water. It is a telegraph station. There is communication by coach with Sale, and hence with Melbourne by rail.

The Western Channel.—At the entrance to the western channel is a red buoy moored close to the sand-bank, which extends to the bar; it lies nearly 4 cables N.E. of the east point of La Trobe island. From the entrance the channel trends West 3½ miles, North one mile, and north-easterly for 2½ miles, to the Midge channel, where a branch, which takes the name of the Albert river, continues to trend in a north-easterly direction for a further distance of 2 miles, whence it becomes more winding, and at a distance of 4 miles is Alberton.

On both sides of the western channel, which for 3 miles is 3 cables broad, there are mud-banks, and when clear of La Trobe island, at 3½ miles from the entrance, there is a channel leading to Welshpool, fit only for boats and small craft. Midway the meeting of the tides has formed mud-banks, which a low-water spring tides completely block the channel.

Alberton in 1881 had a population of 600 inhabitants, and in the entire district 2,904. Coal of good quality is found to the westward of the township, but the country is densely wooded.

Pilots.—There is a pilot at the town of port Albert, who can be communicated with by signal, there being a signal staff on Clonmel island.

TIDES and Tidal Signals.—No tides were observed at the bar. It may be presumed that the time of high water, full and change, is the same as at Rabbit island, or 0 h. 14 m.; springs rise 8 feet.

The signal master at the port, who has great opportunities of watching the tides, reports that for six months of the year, ending with the month of February, the highest tides occur in the morning. The P.M. tides begin to be the highest in March. Winds from W.S.W. cause the highest tides. When the wind is the eastward of south a low tide follows. The tidal signals will be made from a flag-staff on Clonmel island.

The following Tidal signals are at present in use, viz. :—

Letter G, Commercial code,	signifies	no water.	
„ S, „ „	„	7 feet on the bar.	
Ball, half mast - -	„	7½	„
„ mast head - -	„	8	„
A red flag - - -	„	9	„
A white flag - -	„	10	„
A white flag and a ball -	„	11	„
Two balls - - -	„	12	„
A white flag and two balls -	„	13	„

A ball hoisted half mast, in addition to the above, indicates 6 inches.

DIRECTIONS.—A vessel bound to port Albert from the westward should, after rounding Wilson promontory, steer for cape Wellington, after passing which keep Rodondo island just open of it, bearing S. by W. ½ W. until mount Singapore is in line with Townsend point W. ½ S., which will ensure a distance of a mile from the bar ; or, in the event of Rodondo being obscured, mount La Trobe, kept open south of Rabbit island S.W. ¾ S., will lead rather more than a mile to the south-eastward. By using either of these leading marks vessels may arrive within a mile of the bar, when they will be certain to observe the break, if not the buoys. Notice of their approach will then be signalled to town, and the pilot will at once board the vessel. It must be borne in mind that, as the shore of La Trobe island is low, Townsend point will not be visible off the bar, except from a height of about 15 feet.

From the Eastward vessels may approach the shore to a distance of 3 miles, and if at that distance, and coasting to the southward, they will observe the break on the bar ; or they may bring mount La Trobe in line with Rabbit island S.W. ¾ S., and make out the bar from that line.

The now disused lighthouse on La Trobe island is an object by which the bar may be recognised.

Caution.—Masters of shipping are cautioned against attempting port Albert bar without a pilot.

At Night.—As the land is very low, it is recommended not to approach port Albert by night, but to keep a good offing until daylight, and attend to the lead.

The COAST.—Half a mile N.N.E. of Clonmel island is another island of similar formation, which trends in an E.N.E. direction for 1¾ miles, where there is another entrance between it and the island forming the western side of Shallow inlet. This latter island is nearly 4 miles long

N.E. by E. ½ E., with a few hammocks upon it, the highest being those near its eastern extreme, upon one of which (42 feet high) a surveying station is erected. The island, except where the hummocks rise, or a few scattered bushes grow, is scarcely above high water and composed of sand. All are covered with a dwarf vegetation.

Shallow inlet is about 4 cables wide from shore to shore. From either side of the entrance sand-spits extend in a southerly direction, the eastern for three-quarters of a mile, the western for half a mile, leaving a channel between them with not less than 3 feet at low water. The inlet is never used by shipping.*

The COAST.—From the eastern shore of the inlet the coast trends N.E. ½ N. for 3½ miles, and thence N.E. by N. in a nearly straight line to Merriman creek entrance. The distance from Shallow inlet to Merriman creek is 24½ miles; and as the coast from Shallow inlet ceases to have any more openings for a considerable distance, by which even boats may enter, this distance may be spoken of as the first portion of the Ninety-mile beach, which may be said to end at Conran point, though the Red bluff at the entrance to the lakes is a break to its uniformity.

From Shallow inlet to Merriman creek the coast line is nearly separated from the land at the back, which is somewhat higher and thickly timbered, by fresh and salt lagoons or tea-tree swamps, generally salt. At a distance of 17 miles a slightly elevated piece of country, thickly timbered, about 150 feet in height, nears the coast to half a mile, and just to the eastward of this is situated lake Denison, whose waters are discharged into and near the mouth of Merriman creek.

This district is all low, having an elevation from 50 feet to the westward to only 25 to the eastward. Here and there the hummocks fall considerably, and much of the coast is scarcely above high water, while in heavy rains the water of the lagoons is liable to break through the coast line.

Soundings.—From 18 miles N.E. of Shallow inlet to the neighbourhood of port Albert is one immense flat with 6 to 9 fathoms at a mile from the shore, gradually increasing to 13 and 14 fathoms at a distance of 6 miles. Eastward of Seal islands the depths are somewhat greater, especially off Cliffy island, where 20 fathoms will be found at the distance of a cable. A depth of 10 fathoms runs from 2 to 3 miles off the coast about Merriman creek, inside the Seal islands, to the southern shore of Sealers cove. From Seal islands to the Moncœur islands, which lie S.E. of Wilson promontory at a distance of 7 and 8 miles, and towards the promontory, the depths gradually increase, but are no guide to the vicinity.

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* *See* Admiralty chart, Corner inlet to Gabo island, No. 1,016; scale, $m = 0{\cdot}2$ of an inch.

The greatest depth of 40 fathoms, gravel, is found about 2¼ miles South of the promontory lighthouse.

NINETY-MILE BEACH.—The line of coast between Shallow inlet and the Red bluff is locally known as the Ninety-mile beach. Landing may be effected on it, but such a measure is extremely dangerous, as the beach is treacherous, being what is commonly known as a double beach.

When only a few miles from the land on the western part of the Ninety-mile beach nothing can be seen but the back ranges of mountains. These extend in a south-westerly direction for 27 miles, from Toms cap, a hill 1,196 feet high, lying 19 miles West of the entrance to Merriman creek, to mount Fatigue, which is 2,056 feet above the sea. The range between rises to summits of even greater elevation than mount Fatigue, the highest being 2,453 feet. A range of hills, the highest of which has been named mount Albert, and is 1,052 feet high, lies S.E. and East of mount Fatigue at a distance of 6 to 12 miles.

From Corner inlet, north-eastward, to the Red bluff East of the entrance to the Gipps Land lakes, the coast line is a continuous sandy beach, much broken however by inlets and small streams, the latter breaking through the narrow strip of sand after a heavy rainfall. Although a sandy beach is again found north-eastward of the Red bluff for a distance of 30 miles yet this is not a part of the well known, and hitherto dreaded, Ninety-mile beach.

From Merriman creek, which is N.E. by N. 24¼ miles from Shallow inlet, the coast here stretches curvilinearly N.E. ⅛ N. 50 miles to the entrance of the Gipps Land lakes. All this coast is low, from 40 to 85 feet in height, in some places densely covered with tea tree, in others sparsely timbered with honeysuckle, the whole of so uniform and monotonous appearance that, with one exception, no objects easy of identification to the mariner present themselves. The exception is a group of houses immediately at the back of the entrance to Merriman creek, known as Buckley's station.

Lakes or lagoons extend within the shore close inside the sand-hummocks the whole distance; inside of these lakes the coast is low and densely timbered, and the same low country interspersed with lakes and marshes extends for miles inland, much of it being subject to floods.

At distances from Merriman creek of 18, 24, and 28 miles respectively are three hummocks, the easternmost is named Stockyard hill, on two of which marks have been erected. The middle hummock is covered with tea tree, and easily identified by coasters.

At a distance of 10 miles W. by S. of the entrance of the Gipps Land lakes, and 3 miles from the outer line of coast, is a bluff known as Tambo, about 250 feet high. Two miles S.E. of Tambo bluff is Shaving point, and this comparatively high land on the north shore of the Gipps Land lakes continues to the lakes entrance, then follows to Red bluff, skirts the arms and streams of lake Tyers beyond it, and following the line of the shore at about 2 miles inland, is not again lost; and giving as it does a higher appearance to the coast line, clearly marks the difference between the land to the east and that to the west of the entrance to the Gipps Land lakes.

The most conspicuous portion of the land just described is Jemmy point, which lies W. by S. ¾ S. 3½ miles from the entrance of the lakes, and half a mile from the outer line of coast; it is 233 feet high, and partly cleared of timber. Abreast of this point an artificial entrance is being formed, to supersede the present natural entrance.

The ENTRANCE of the GIPPS LAND LAKES is one mile S.W. of Red bluff. An easterly gale, accompanied by a season of drought, will completely bar the entrance, while an easterly gale alone will lessen the depth on the bar.

Steam-vessels trade regularly once a week to the lakes when the entrance is open. The vessels are flat-bottomed, and the largest does not draw more than 6 feet. The lakes are open for vessels drawing 6 feet from August to February; they occasionally, though rarely, remain open all the year round. The worst months for navigation are March, April, May, and June.

Though the vicinity of the entrance is easily recognisable by Jemmy point to the west, and the Red bluff to the east, the actual entrance is far from conspicuous; indeed, a vessel must be almost in the breakers before an opening is observed, and even then it appears as if she must run straight on to the beach.*

Between sunrise and sunset, two poles painted white, 12 feet and 18 feet high, will be erected on the mainland. The outer, or 12 feet pole, kept in line with the inner or 18 feet pole, will lead through the fairway.

A masthead light will be exhibited from a flagstaff 60 feet high near the entrance, between sunset and sunrise, but not to indicate the depth of water or position of the channel.

Gipps Land.—The climate and soil of Gipps Land are well fitted for the growth of oranges, limes, hops, tobacco, and opium, and the rivers abound in fish. The most important exports of Gipps Land are gold, wattle bark, cattle, wool, leather, grain, hops, dairy produce, sheep and kangaroo skins, and a large fish trade.

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* It was considered that a difference in the levels of the sea and lakes existed; but when the lakes were at an average level, the result of two levellings, at a point 14 miles from the entrance, gave the lakes 6 inches higher than the low-water level of the sea, the greatest range on the outer beach being only 3 feet.

The principal towns are Sale the capital, and Bairnsdale. The population of Sale and Bairnsdale, in 1881, were 4,000 and 854 respectively; and of the whole district of Gipps Land for the same year was 20,040.

Sale lies 9 miles up the river La Trobe, which falls into lake Wellington, and is 52 miles from the lakes' entrance. It is connected with Melbourne by rail and telegraph.

Bairnsdale, 22 miles from the lakes' entrance, lies 8 miles up the river Mitchell, which falls into lake King. There is a telegraph station here.

TIDES.—It was found to be high water, full and change, at the entrance of the lakes at 8 h. 30 m.; the greatest rise observed at spring tides was 3 feet; but at a position on the beach 15 miles to the westward it was high water, full and change, at midnight, the same time nearly as at Rabbit island, and port Albert. Here the rise was also 3 feet, and in both places the rise depended entirely upon the wind, rising highest with south-westerly winds. In calms, or with other than south-westerly winds, or even with south-westerly winds if light, the rise was almost nothing, upon one occasion during a calm only giving a range of one inch.

Red Bluff lies E.N.E. one mile from the lakes' entrance; it is over 100 feet high, and conspicuous from its colour. It rises gradually to a height of 200 feet, and, like the land about it, is thickly timbered, though not so much near the coast as inland; the bluff has a few rocks off it, which do not, however, extend far to seaward.

From Red bluff the coast, which is similar to the land of Red bluff, runs N.E. by E. ¼ E., 1½ miles to the entrance of lake Tyers.

Lake Tyers.—The entrance of lake Tyers is generally barred across, but after a season of heavy rains there is a similar entrance to that of the before described lakes, and vessels of nearly the same draught could enter during the short period that it is open; it is easily recognised from seaward, thus forming a great contrast to the entrance of the Gipps Land lakes.

Tidal signals to denote the depth of water on the bar, are shown between sunrise and sunset from a flagstaff on the mainland near the entrance. Ebb tide is indicated by letter J, Commercial code, at half-mast; and the flood by the same flag at the masthead.

ASPECT.—When off the Ninety-mile beach at a distance of 10 or 12 miles (unless near its eastern part), nothing will be visible except the high mountainous ranges to the west, north-west, and north; the coast being generally about 60 feet high, is not visible from a ship's deck at that distance. As the eastern part of the Ninety-mile beach is approached, the mountain ranges, gradually near the shore and take the character of high and distinct hills, or separate hilly ranges.

Mount Taylor.—The first hill of importance is mount Taylor, 1,630 feet high; this hill lies W. by N. ¼ N. 25 miles from the entrance of the lakes; as the trees on the summit have been cut down, it presents a table-like appearance.

A hill of greater extent, but not so high, lies 2 miles West and N.W. of mount Taylor. North-east of mount Taylor, at a distance of 22 miles lies a conspicuous mountain known as Little Dick.

Little Dick, N.N.W. 23 miles from the entrance of the lakes, is 3,154 feet high, and shows generally with three round summits; being a high and large range it is a conspicuous landmark.

Mount Willie.—South-east of Little Dick, and 9 miles back from the coast at lake Tyers, is a prominent hill known as mount Willie. It is 1,182 feet high, has a flattish top, and is conspicuous as being nearer the coast than any hill from Wilson promontory to lake Tyers.

Mount Tara, N.N.E. ¼ E. 9 miles from mount Willie, has two conspicuous summits, with other smaller summits of lesser importance; the principal summit is flat-topped, and 1,993 feet high. Much timber has been cut down here, but a solitary large tree is left standing; the large gap on the summit of the hill and the solitary tree will enable strangers to recognise mount Tara.

From mount Tara eastward and north-eastward the country is mountainous, some of the ranges approaching within a few miles of the coast.

The COAST from the entrance of lake Tyers trends with a curve E. by N. ¾ N. 21 miles to the Snowy river entrance, and is similar to that West of the lakes' entrance, though the sand-hummocks are higher, especially towards Snowy river, near which they attain a height of 176 feet. Immediately at the back of the coast line, extending the whole distance, is a fresh-water morass, and generally half a mile from its margin is the higher back country, which along this part of the coast is about 200 feet high, and densely timbered. The hummocky shore is faced with sand-cliffs or patches, but of so uniform an appearance that only one patch close to the Snowy river is worthy of notice. This patch, lying as it does half a mile to the westward of the entrance, will be a good guide to it; a log station built by the survey party on the highest hummock, rather more than a mile West of the Snowy river, will also be a good guide.

Shoal.—At 4 miles S. by W. ½ W. of the Snowy river entrance is a patch of uneven rocky bottom, upon which the least depth found was 8 fathoms; close to this foul ground is 20 fathoms, sand.

Snowy River has an entrance similar to the lakes; it discharges a large body of water, and appears during the time it is open to preserve nearly the same depth as is found on the bar at the entrance of the lakes.

At present there is no trade, consequently vessels do not use the entrance, which, with similar precautions to those taken at the lakes, would be equally safe. The land about Snowy river is occupied as cattle stations.

Ricardo Point bears E. ½ N. 4½ miles from the Snowy river entrance. Some years since this entrance was close to the westward of the point, but a low sandy shore now occupies the space between, at the back of which is a salt-water lake, with an occasional opening into the sea, near the mouth of the Snowy river. The hummocks on Ricardo point are about 100 feet high, the point itself is rocky, sunken rocks extending more than 2 cables from the shore in all directions.

Mount Raymond.—N.N.W. 6 miles from Ricardo point is mount Raymond, a conspicuous hill, 992 feet high at its north elevation; mountain spurs extend in a southerly and south-easterly direction.

CONRAN POINT lies E. ½ N. 5 miles from Ricardo point; it projects nearly one mile from the general line of coast, but is not easily distinguished; the land about the point is flat, and covered with a dense dwarf scrub. On the highest part of the point, 192 feet above the sea, a surveying station is erected, but this is not visible except when it is within a distance of 2 or 3 miles. The shore between Conran and Ricardo points forms a sandy bight, skirted with grassy hummocks over 100 feet high. In the centre is one conspicuous hummock 163 feet high, with a sand-patch near its summit, over which is a grove of tea tree.

Under the eastern part of Conran point, extending one-third of a mile off shore, are numerous sunken rocks upon which the sea breaks heavily.

In fine weather there is landing to the westward of the point; landing will also be found to the eastward, but it is not good. One and a half miles in shore of Conran point, and extending at that distance, from the coast line to the Snowy river, the higher ground is densely timbered, with an average height of about 300 feet.

Beware Reef lies E. ½ N. about 2½ miles from Conran point; the reef is 8 feet above high water, and has sunken rocks (upon which the depth is uncertain) lying East and S.E. of it to a distance of one-third of a mile.

Pearl Point bears E. by N. ¾ N. 7½ miles from Conran point; the coast between forms a bight with a low sandy shore, and the back range rises to a height of about 300 feet. In the bight are two small fresh-water streams; off the mouth of the westernmost are two patches of sunken rocks more than a quarter of a mile from the shore.

To the eastward of Pearl point are two conspicuous conical sand-cliffs, which render the point easy to identify. Scattered rocks lie off Pearl point to the southward a distance of 2 cables, and one mile to the eastward sunken rocks extend from the shore one-third of a mile. The ridge of densely timbered broken country spoken of as lying at the back of Conran point, is also found at the back of Pearl point, whence it extends more inland towards mount Cann at the back of Sydenham inlet.

Aspect.—The aspect of the land at the back of Pearl point is marked in character, as from the Snowy river eastward to cape Howe there is no part of of the coast that is not defined by some conspicuous mountain or hill. At the back of Ricardo point, 6 miles inland, is mount Raymond, which has been already described. N. by E. ¼ E. of mount Raymond, distant 12 miles, is the conspicuous long range of Diana, over 3,000 feet high; and still to the N.N.E., at a distance of 21 miles from mount Raymond, is mount Ellery, a double-peaked mountain. A surveying station is erected on its southern summit, being built on an enormous granite boulder which is elevated 4,300 feet above the sea.

Sydenham Inlet.—From Pearl point the coast runs in a nearly straight line E. by N. ¼ N. 6½ miles to Sydenham inlet, the entrance to lake Bemm; over this district are well grassed hummocks about 100 feet in height, North of which the land is low for some distance. At the back of lake Bemm the land is densely timbered, with an elevation of about 300 feet.

Sydenham inlet is small, and not worthy of particular notice. North of lake Bemm, at a distance of 8 miles from the shore is mount Cann, a peaked hill 1,885 feet high, upon the summit of which is a surveying station. Trees have been felled to make the station clear, and the gap will prevent mistake as to the identity of this mountain.

From Sydenham inlet the coast trends E. by N. 5½ miles to the Tamboon river, and thence about 2 miles in the same direction to a rocky stretch of coast, off which are several sunken and dry rocks, the highest of which, named Cloke rock, is 25 feet above high water. One and a half miles inland is Double hill, 924 feet high.

CAPE EVERARD bears E. ¼ S. 6½ miles from the Tamboon river, and is easily recognised by a sandy peak 538 feet high, lying about one mile to the northward of the cape. This summit has a gradual fall to the westward of bare sand, and is more remarkable when viewed from that direction. It was found in the course of the survey very difficult to judge distances from this cape, as it frequently appeared to be only one half the real distance.

Cape Everard has four points, the southernmost of which projects nearly 1½ miles from the line of coast. The cape is composed of granite, with boulders strewed over the whole face. There is landing in fine weather in the western bight. A deep but exposed bight lies to the south-eastward of the cape. A rock above high water, and several awash or sunken, are scattered 2 cables off the southern points of cape Everard.

A reef of rocks, nearly awash at high water, lies nearly 2 cables East of the eastern part of the cape. There is deep water between these rocks, the outer of which has 18 fathoms close-to to seaward.

Dangers off Cape Everard.—In addition to the scattered rocks there is a rock 3 feet above low water, and therefore barely covered at high water, lying E. by S. ¾ S. three-quarters of a mile from the southern part of the cape; and another the same distance E. ½ N. from the same point, with only 7 feet on it at low water. These detached dangers occupying a position close to the fair way of steam vessels trading between Melbourne and Sydney, require due caution to avoid them.

Everard Hill, 5 miles North of cape Everard, is densely timbered, and 1,200 feet high. From cape Everard a sandy beach trends in a north-easterly direction 2 miles to the mouth of the little river Toolaway.

Island Point, named from a rock, 30 feet high, which lies close off it to the southward, at about 7 miles eastward of cape Everard; S.E. by S. 2 cables from this rock is a smaller rock, only one foot above high water. The coast line between cape Everard and Island point consists of sandy beaches with rocky points having reefs lying off them for 2 cables. About midway, and close to the coast, is a group of conspicuous bare sand-hummocks, and to the eastward of this group are several sand-patches.

From Island point the land trends with a curve E. by N. 2½ miles to Rame head. Between cape Everard and Rame head the coast rises gradually inland, until at 2 or 3 miles from the shore it attains an elevation of about 600 feet. The country is densely timbered and undulating.

RAME HEAD, of granite formation, rises to 378 feet on its eastern side; another summit of the same elevation rises close to the south-westward. The western part of the head is fringed with rocks, and a rock awash lies close S.E. of the extreme point. Densely timbered ranges occupy the district between Rame head and Genoa peak; the latter bears from the head N. by E. ½ E. distant 16 miles.

From Rame head the coast trends in a northerly direction for 1½ miles as far as a sandy beach; thence in a north-easterly direction for nearly a mile to Wingan inlet. Over the sandy beach, and near its western part, is a sand-cliff 204 feet high.

Wingan Point, which forms the eastern side of the entrance into Wingan inlet, bears from Rame head N.E. by N. 2 miles. Wingan inlet is difficult of access. The best time for entering in a boat is after westerly winds. Landing may sometimes be effected outside the inlet to the westward of Wingan point. Oysters are found in this inlet.

Off the point to the southward are the Three Skerries rocks, the highest and centre of which is 42 feet above high water. In addition to the Skerries, there are detached rocks, some above high water, lying near them; the outer of these, which is covered at high water, is half a mile from Wingan point. From Wingan point the coast trends in a north-east direction 4 miles to Sand-patch point.

Sand-patch Point is well named; a large body of drift sand near the point making it conspicuous. The only part of the coast which at all resembles Sand-patch point is cape Everard, but there the drift sand is not so conspicuous when seen from the eastward; the sand also at cape Everard is higher than at Sand-patch point.

Danger off Sand-patch Point.—To seaward on a S. ½ E. bearing, nearly half a mile from Sand-patch point is a pinnacle rock with 1½ fathoms on it at low water, known as the Long reef. It is a dangerous rock, on which the sea breaks occasionally.* A rock awash lies close to Sand-patch point to the south-eastward.

Little Rame Head lies N.E. ½ E. 4 miles from Sand-patch point; the coast between is about 300 feet high, and forms a rocky bight with a few sandy beaches. Upon a hill 240 feet high, immediately over the head, a survey station is erected, East of the head, at a distance of 2 cables is a rock 10 feet above the level of the sea.

Race.—Off Little Rame head, at a distance of 4 miles in a S.E. by S. direction, 19 fathoms, rock, will be found near 35 fathoms, sand; and at a distance of 7 miles in the same direction 27 fathoms, rock, will be found near 50 fathoms. This uneven bottom extends over a distance of 3 miles, causing a confused sea; in heavy weather small craft should avoid the place.

The COAST.—From Little Rame head the coast trends with a bight 3 miles N. by E. ¾ E., and thence with another and deeper bight N.N.E. ¼ E. 5 miles to Bastion point. As a continuous heavy swell rolls on this coast, it should not be approached nearer than a mile; it also appeared to be fringed with sunken rocks. One mile to the south-westward of Bastion point is a conspicuous sand-patch.

Bastion Point is comparatively low, being only 75 feet high; the land behind the point, and between it and Little Rame head, is densely timbered, and rises to the height of about 300 feet.

To the southward and south-eastward of Bastion point are numerous rocks on which the sea breaks, one, with 1½ fathoms upon it, lies 3 cables to the south-east, and another, 3 feet above high water, lies 3 cables to the south-west. The land of Bastion point forms the west side of Mallagoota inlet. There is a landing place in fine weather on the north side of the point.

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* In the surveying steam-vessel *Pharos* the rock was passed several times, and almost considered not to exist, when one day it was observed to break.

Mallagoota Inlet forms the entrance to Mallagoota lake and Genoa river; the bar can rarely be crossed in a boat. The depth upon this bar is uncertain, and except in the finest weather a heavy swell rolls into the inlet, which breaks at half a mile from the shore.

Three-quarters of a mile North of Bastion point, is the low and sandy eastern point of Mallagoota inlet. From this point the land forms a sandy bight to Telegraph point, which lies from it E. by N. ½ N. 6½ miles.

At 4 miles from the inlet, the coast line projects to the southward, towards Tullaburga island.

Tullaburga Island, 28 feet high, lying E.N.E. 4 miles from Bastion point, is a rock with little soil, and a few bushes on the north-east part.

At 1½ miles to the south-west of Tullaburga there is uneven bottom, but not less than 7 fathoms water was found.

GABO ISLAND lies E. ¼ N. 3 miles from Tullaburga island. It is nearly 1½ miles long, in a N.W. by N. and S.E. by S. direction, and about half a mile broad near the centre and south extreme; towards the north extreme the island tapers gradually to a point, which latter consists of low granite boulders, separated by a channel about 1¾ cables wide, from Telegraph point on the mainland. Gabo island, composed of red granite, is steep-to in all directions, except to the northward. To the westward the slopes of the island are covered with grass and dwarf bushes. Near the centre are a few sand-hills whose bare sides face the south-east, and only show as sand-hills in that direction; the remains of the old lighthouse are upon the highest of these hills, which has an elevation of 171 feet.

On the north-west side of the island is a small sandy bay, with 5 fathoms in the central part, where there is good anchorage for one vessel, except in south-westerly gales. In the course of the survey in 1871 the *Pharos* rode out several moderate south-westerly gales in this bay. It is probable that a gale of some continuance would have to blow direct in before the swell would make the anchorage unsafe. It was observed that though there was often a heavy swell outside, scarcely any was ever felt at this anchorage.

A small but constant stream of fresh water runs out on the small sandy beach at the anchorage.

In the narrow channel between Gabo island and the mainland, the deepest part has about 6 feet water; boats ocassionally may use this channel, but a confused sea, caused by the meeting of the swell from opposite sides of the island, renders it unsafe.

LIGHT.—The lighthouse situated on the south-east extreme of Gabo island, close to high-water mark, is built of red granite, exhibiting, from an elevation of 179 feet, a *fixed* white light, visible from seaward in clear weather 20 miles, on an arc from E. ½ N. to S.W. by S.

Telegraphic Communication is kept up between Gabo island and the mainland.

TIDES.—It is high water, full and change, at Gabo island at 8h. 50m.; springs rise 6 feet.

Currents and Tides.—During the progress of the survey, in 1871, no current was felt inshore between Wilson promontory and Gabo island.

At the western part of the Ninety-mile beach a tidal stream exists, which is gradually lost in proceeding north-eastward, and near the entrance of the lakes is not observable. The flood stream runs to the south-west, and the ebb to the north-east, and had at 20 miles East of Shallow inlet a force of one knot at spring tides.

It is generally reported that a current sets eastward through Bass strait with westerly winds, and westward with easterly winds, continuing for one or two days after the respective winds have ceased. *See* page 402.

Weather.—The experience of the weather on this coast which was obtained during the survey, does not point to any great hazard in approaching the Ninety-mile beach. In westerly gales comparatively smooth water is obtained by working up in shore when to the westward of the entrance of Gips Land lakes. Easterly gales are not without warning signs, therefore if a vessel did happen to be in shore when an easterly gale was threatening, she should at once get an offing.

As the western part of the Ninety-mile beach is approached, easterly gales are not so generally felt; Wilson promontory appears to be the dividing point. In the summer months, as westerly gales invariably veer to the southward, it is more advisable to stand towards the Tasmanian coast, and so be ready to take advantage of the shift of wind.

In the winter months, and more particularly in September, October and November, the same course cannot be recommended; the wind during these months does not shift for a continuance, but is constantly backing to the west-north-westward

SOUNDINGS.—From Hogan group, 29 miles eastward of Wilson promontory, to 54 fathoms at 7 miles southward of Gabo island, there are 28 to 42 fathoms for the first 60 miles, and then no bottom at 59 and 53 fathoms, until within 10 miles of Rame head, where there are 70 fathoms, sand. Between this line of soundings and the Long Northern beach the space appears not to have been sounded beyond 10 miles from the coast, except that from 25 and 35 miles north-eastward of Hogan group, where the depth gradually decreases towards the land to 10 fathoms at N.E. by E. ½ E. 25 miles from Shallow inlet, where that depth is 15 miles from the shore, whilst at 8 miles, the depth is 17 fathoms.

EASTERN ENTRANCE OF BASS STRAIT.*

The eastern entrance of Bass strait is the space included between Wilson promontory and the north-east point of Tasmania. Between these two headlands are numerous islands, occupying an extent of about 120 miles, which, from their formation of granite, and the manner in which they lie, as a connecting chain, would appear to have been the upper part of a range of hills which once joined the two lands, before a combination of natural causes produced the opening which bears the name of Bass strait.

That such was the original formation of this part, or at least its disposition a comparatively few years ago, appears extremely probable on inspecting the chart; as also that Wilson promontory and cape Liptrap were formerly insulated, but have been rejoined to the mountains behind them, by the south-east gales of winter throwing up the sand and loose earth, such as now form the Long Northern beach.

Tidal Stream.—At the eastern part of the fairway of Bass strait, the flood stream comes from the eastward in a direct line from the Furneaux group towards Hunter and King islands. At these islands this tide is met by a flood stream coming from the south-westward; the high tide thus made by the junction of the two streams occurs near King island 2 hours after it is high water at the Furneaux group, or at 2 hours full and change.

Vessels proceeding eastward from the neighbourhood of King island will find the tidal stream against them, of longer duration than the stream in their favour.

CURTIS ISLE, S.E. ¼ E. 18½ miles from Rodondo isle is 1½ miles long N.E. and S.W., and two-thirds of a mile broad, with a square summit on its southern part 1,060 feet high; but towards the north it slopes away something in the shape of a shoe, from which it is called by the sealers the

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* *See* Admiralty chart, Bass strait, No. 1,695a; scale, $m = 0 \cdot 20$ inches.

" Slippper," and may be seen in clear weather, at the distance of 33 miles. The central position of this island renders it quite a finger-post for vessels passing through the strait.

The Sugar Loaf Rocks are two in number; one, which is 350 feet high, bears S.E. ½ E., distant one mile; and the other, 316 feet high, S.S.E. 2½ miles from the summit of Curtis isle. There is deep water close to them, except at the south side of the northern Sugarloaf, and the northern side of the south Sugarloaf, off each of which there is said to be a small rock, at the distance of a quarter of a mile.

Clarendon Rock, discovered in 1857, lies E. by N. ½ N. 2 miles from the summit of Curtis isle, and has 9 feet water on it.

Mr. G. N. Levesay, master of the *Pyramus* in 1839, reports having seen a rock awash at about a mile to the northward of Clarendon rock; but, according to the opinion of Captain P. P. King, R.N., in 1853, this report wanted confirmation.

No other dangers are known to exist about these islands, and they have been frequently approached close to by many passing vessels.

CROCODILE ROCK is dangerously situated in the line midway between Rodondo and Curtis isles, being distant 9 miles from each island. Captain Hobson, who passed within a mile of it in H.M.S. *Rattlesnake*, in 1837, states, that for a space probably of 50 yards, the rock is elevated about 3 or 4 feet above the level of the sea at high water, and appears to have a reef extending three-quarters of a mile to the north-west. Captain Stokes describes it as a smooth round-topped granite boulder, just protruding above the surface of the water, and that in fine weather, the sea runs over it without breaking.

Devil's Tower, N.N.E. ½ E. 7½ miles from the summit of Curtis isle, is a small but conspicuous lump of bare granite 350 feet high, and is fringed by a reef; it is frequented only by seals and birds, and their pursuers, and appears to have no dangers in its immediate vicinity.

HOGAN GROUP is a cluster of small rocky islands lying close together, the largest of which lies N.E. ¼ N. 15 miles from Devil's tower; this island, which is also the most elevated of the group, is 1½ miles long, North and South, and 430 feet high. One of the smallest of the group lies close to the south-east point, and two dry rocks lie near the north point of the largest island, with which all appear to be connected by reefs. Two other islets of the group front a boat-cove on the north-east side of the largest island; and at about 2 miles north-eastward of the north point of the island are two rocks, the outer one just awash.

Water.—There is fresh water in the boat-cove, and the upper parts of Hogan group produce some little vegetation.

Soundings.—There are soundings in 40 to 29 fathoms from Curtis isle to Hogan group, and between them and Wilson promontory there are similar depths of water, the bottom being generally sand, shells, and coral.

DIRECTIONS.—No other covered dangers are known to exist between Curtis isle and Wilson promontory; but in the night, or during thick weather, it will be prudent for a stranger who is desirous of clearing the strait, to obtain a sight of Curtis isle, and pass on its south side, to the southward of the Sugarloaf, between the latter and Judgment rocks, as its high summit and the two Sugarloaf rocks to the southward of it, are remarkable objects, by which its identity cannot be mistaken.

KENT GROUP, S.E. by E. 18 to 23 miles from Hogan group, consists of Deal and Erith islands, divided by Murray pass, and of N.E. isle, which lies E.N.E. 1¾ miles from Garden point, the north extreme of Deal island.*

Deal Island, the south-easternmost and largest of the group, is 3¼ miles, long, North and South, and 2¼ miles broad. It rises to conical granite hills, some of which are clothed to their summits with an impervious scrub. The highest of these hills, on which is the lighthouse, rises from the south point of the island to the height of 883 feet.

Anchorages.—Deal island has four sandy coves where vessels may anchor. Garden cove, in which is fresh water, is at the north end; Squally cove is on the east side of the south point; Winter cove is on the east side, and East cove is on the west side of the island. H.M.S. *Beagle* was detained a fortnight in East cove by easterly gales; but it was found a confined anchorage, although H.M.S. *Bramble,* with the aid of a kedge anchor to keep her steady, had sufficient room, and experienced no difficulty in getting in or out.

Lieutenant J. St. C. Bower for Navigating duties, H.M.S. *Danäe,* February, 1879, remarks: Garden cove is too small for a vessel of the Danäe's size; also, while seeking shelter during a heavy westerly gale, the Danäe entered Squally cove with the intention of anchoring, but finding 22 fathoms water in the centre of the cove, and no bottom at 18 fathoms within a cable of the shore, they had to leave again immediately.

LIGHT.—The lighthouse on Deal island, which is situated on the summit, at the south-west side, and E. ¾ N. 32 miles from Curtis isle, is a circular stone tower 67 feet high, with its upper part red and lower white, exhibiting, at the height of 950 feet, a light which *revolves every minute* and *forty seconds*. At the distance of 10 miles it is *fifty seconds* bright and *fifty seconds* dark. The light is visible at the distance of 36 miles; but from its great elevation, it is sometimes obscured by fogs.

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* *See* Admiralty plan on chart of Bass strait, No. 1,695a; scale $m = 2 \cdot 0$ inches.

Murray Pass, the channel which separates Deal from Erith island, is nearly half a mile wide, with soundings in 29 to 33 fathoms in mid-channel.

Erith Island, the western of the two principal islands of Kent group, is 3¼ miles long, N.N.E. ¼ E., and S.S.W. ¼ W., and is about 1¼ miles across, at its broadest part. At one mile from Foreness, the north point of the island, it is nearly divided into two by the Funnel, a narrow isthmus, awash at high water. This, like Deal island rises to hills, one of which, near its northern end, is 535 feet high. The west side of Erith island forms an exposed bay, in the entrance of which, at about three-quarters of a mile northward of West bluff, the south-west point of the island, is the doubtful position of a sunken danger. On the east side of the north point of this bay is Wallabi cove, at about half a mile off the entrance of which is a patch of rocks above water, W. by N. ½ N. half a mile from Foreness, the north point of Erith island.

Anchorage.—West cove is an anchorage in 8 and 7 fathoms on the east side of Erith island, at about half a mile to the northward of the Funnel. It affords shelter from westerly winds, but it is subject to violent gusts, which do not reach East cove. Vessels lying here should have a cable to the shore, as the prevailing winds blow in strong gusts over the high land.*

N.E. Isle is about 1½ miles in circumference; it rises to a hill in the centre, and has some rocks close about it.

Kent group appears free from any other detached dangers than those already noticed; and the rocks about the numerous points of the island do not appear to project very far.

H.M.S. *Danäe* passed between N.E. isle and Deal island, and observed no dangers.

The channel between Hogan and Kent groups is 17 miles wide, with soundings in 29 to 35 fathoms.

Water.—Fresh water is abundant in the northern part of Deal island, and there are many parts of the island capable of cultivation.

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* In 1879, the wreck of a steam-vessel nearly in the centre of the cove, with her masts above water was a great obstruction, and very much limited the space for anchoring in. Lieut. J. St. C. Bower, H.M.S. *Danäe*.

TIDES.—It is high water, full and change, at Kent group at 11 h 10m.; springs rise 8 feet; the stream in Murray pass, which runs from 2 to 5 knots, changes to the northward 20 minutes after high water.

JUDGMENT ROCKS, so named from the resemblance of one of them to an elevated seat, lie W. by S. ¾ S. and W. by S. 9 miles from the lighthouse on Deal island, and consist of a steep island two-thirds of a mile long, with two smaller islets and rocks to the northward of it.

The PYRAMID, South 20 miles from Deal island lighthouse, is a small elevated flat-topped rock 300 feet high, through which there is a chasm. A sunken reef extends nearly half a mile from its south side; but it is otherwise safe to approach, having 38 to 40 fathoms water between 4 and 5 miles to the north-west and south-west, and 26 fathoms at 8 miles to the eastward, on a bottom of sand and shells.

WRIGHT ROCK, E. by S. ¾ S. 11½ miles from Deal island lighthouse, is small; but being 200 feet above the level of the sea, it is a conspicuous object. Captain Flinders passed at night, near enough to the south side of this rock to hear the seals on it, and had 30 fathoms on a coarse bottom; but this passage is rocky and unsafe.

The channel between Kent group and Wright rock, which is 10 miles wide, has tolerably regular soundings in 24 to 29 fathoms, sand and shells; there are 29 fathoms, gravel and small stones, at 2 miles to the north-west of Wright rock, and the same depth, on a coarse sandy bottom, 5 miles to the northward. This depth continues for 30 miles farther in a N. by E. direction, when it gradually increases, and the bottom becomes fine sand.

ENDEAVOUR REEF, which covers, lies with Wright rock and Deal island lighthouse in line, distant about 2½ miles from the rock.

Beagle Reef, East 3 miles from Endeavour reef, is just awash at high water.

Craggy Isle, S.E. by E. ¼ E. 9 miles from Wright rock, is small and cliffy, with rocks close to its east and west ends, and a sunken rock at one mile E.N.E. of it.

Craggy Rock.—In the fairway of the channel between Craggy isle and Flinders island, at 2½ miles S.E. ¼ S. from Craggy isle lies a rock (Craggy rock) with 24 feet water over it, and probably less, having 16 to 17 fathoms close around.

The Chief Dangers to the south-eastward, between Kent group and Flinders island are Endeavour and Beagle reefs, and the sunken rock E.N.E. of Craggy isle which appear to be connected by foul ground, the north-west and south-east extremes of these dangers being marked by Wright rock and Craggy isle, between which vessels should not pass, although, on an emergency, a vessel may go through the narrow channel on the south side of Wright rock.

TIDES.—It must be borne in mind that the tide streams, which here sometimes run 2 knots, set S.W. by S. and N.E. by N. the north-easterly, or ebb stream, beginning at a quarter before noon, at full and change.

FURNEAUX GROUP, the south-easternmost of the chain of islands between Wilson promontory and the north-east extreme of Tasmania, consists of Flinders and Barren islands, the largest two of the group, and numerous smaller islands, rocks and shoals. This group extends from the Sisters S.S.E. nearly 60 miles to Moriarty banks, and 32 miles across.

These islands were inhabited in 1881 by 289 persons who procure a living by seal-fishing and preserving mutton birds; many of them "half-castes," the offspring of marriages between the sealers and aboriginal women.*

The Sisters are two high islands, from one to 5 miles off the north end of Flinders island, one bearing E. by S. ½ S., distant 29 miles, and the other E. ½ S. 32 miles from Deal island lighthouse, and are visible in clear weather, at the distance of 30 miles. The Sisters have rather uneven surfaces, with not much vegetation, but they harbour numerous sea-birds. The south-western and larger island is 690 feet high, and upwards of 3 miles long, East and West, and is nearly surrounded by sunken rocks. A reef extends from the island to the north extreme of Flinders island. The north-eastern island, which is 636 feet high, and about two-thirds the size of the other, has a detached rock at nearly a mile to the southward of it, and sunken rocks close to all its points, except that to the north-east. The channel between these two islands is 2½ miles wide, with 9 to 20 fathoms water in it.

FLINDERS ISLAND, the largest of the Furneaux group, is 36 miles long, about N.W. and S.E., and 20 miles broad at the centre, and contains 513,000 acres; its north-west point, from which a reef projects a short distance, bears nearly E. by S. ¾ S., distant 28½ miles from Deal island lighthouse. The principal ridges on the island take a general S.S.E. direction from its north-west point to its south-west extreme, and are barren and mountainous, presenting a bold abrupt front to the westward, and sloping to the low land on the eastern side, which is bordered by a sandy beach. These ridges are separated at about the middle of the island, by

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* Australian Handbook, 1883.

Heathy valley, which stretches across it. The west side of Flinders island is fronted by several small islands, under the lee of which vessels may find shelter from westerly winds.*

Mount Killicrankie rises from the north-west part of the island to the height of 1,000 feet.

Cape Frankland, S.S.W. 9 miles from the north-west point, is the western and central extremity of a hilly peninsula extending 5 miles N. by W. and S. by E., and 4 miles from the western coast-line of Flinders island, and has a bight to the North and South of it.

A reef projects a short distance from the cape, and two islets with some rocks lie between half and 2½ miles N. by E. of it.

A reef extends one-third of a mile from the south point of the peninsula; and in the bight to the eastward of it, is the cluster of Flat rocks, between which and the shore to the northward, there is a Boat-harbour, with 3 fathoms water in it. Between the south point of the peninsula of cape Frankland and Settlement point S.E. by S. 6 miles from it, the west coast of Flinders island forms a bay 3½ miles deep, with 8 to 10 fathoms across its entrance, and 9½ to 4 fathoms along its southern shore; but it is exposed to the westward.

Pascoe Islets, which are four in number, the innermost 256 feet high, and mostly connected by reefs, extend from the shore at 2 miles south-eastward of the cape, 4 miles in a South direction.

Frankland Rock, W. ¾ S. 4¼ miles from cape Frankland, is a double rock awash at half tide, with 18 to 23 fathoms close about it.

Settlement Point is hilly, having a small reef on its south side, and a cluster of islets and rocks extending a quarter to 1¼ miles south-westward from it, with 6 fathoms between the islets and the point.

The west coast of Flinders island, from Settlement point, curves E. by S. ½ S. 2 miles to a projection, between which and Long point, S.E. 4½ miles from it, is a bay 1½ miles deep, with mountainous land behind it; the highest summit being the Sugarloaf, which bears East, distant 6½ miles, from Settlement point, and is 1,410 feet high.

HUMMOCK ISLAND, the north point of which lies W. by S. 3¾ miles from Settlement point, is 5½ miles long, N. by E. and S. by W., and is one mile broad at either end, between which it is only half a mile across. Its two highest hills are on its northern and southern ends, the former being 513 and the latter 400 feet high. From the north point a reef stretches three-quarters of a mile to the northward, a continuation of which borders the eastern side of the island and trends along shore southward to the Koh-i-noor rocks, at 2 miles from the south point. The 5-fathoms edge of this reef extends one-third of a mile from the shore.

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* *See* Admiralty plan, Flinders island anchorage, on sheet of plans of Bass strait anchorages, No. 1,694.

It is reported that the rocks and depths in the vicinity of Flinders island have been subject to considerable changes owing to a series of earthquake shocks.—Melbourne Daily Telegraph, 9th May 1884.

Anchorage.—There is good anchorage in 6 fathoms water, on the east side of Hummock island, at about three-quarters of a mile to the northward of the Koh-i-noor rocks just noticed, and half a mile from the shore. It may be approached by passing round either the north or south end of the island. H.M.S. *Elk* here rode out one of those violent shifting gales, or revolving storms to which these localities are subject.

Approaching this anchorage from the southward the shore must not be hugged too closely as the Koh-i-noor rock, which is awash at low water, lies about one-third of a mile off shore.

Tides.—It is high water, full and change, at the anchorage, Hummock island, at 10h. 30m.; springs rise 10 feet.

Low Islets (Passage islets) are three in number, lying between S.E. by S. a mile, and South 1½ miles from the south point of Hummock island: they lie in line, N.N.E. ½ E. and S.S.W. ½ W.; the southernmost and largest islet being half a mile in extent. The reef on which these islets are situated extends nearly half a mile northward, from the north-easternmost islet, between which and the south point of Hummock island is a safe passage half a mile wide.

Long Point, which has a rock awash close off it, is a peninsula stretching about 1½ miles southward from the line of coast, from which it is nearly separated by a shallow inlet having a narrow entrance, with a small islet close to its eastern point, and another on the west side of the inlet. Between Long point and another projection 2½ miles to the eastward of it, the bight is full of shoal patches, which appear to prevent a near approach to the fresh water close to the shore, at three-quarters of a mile to the northward of the eastern point of the bight.

From the east point of the bight, just noticed, the west coast of Flinders island takes a S.S.E. direction 6½ miles to the north point of a hilly projection, extending 1¼ miles N. by W. ½ W. and S. by E. ½ E., and one mile from the line of coast. Between 2 and 3 miles northward of the point is a slight projection of the coast, close behind which is a fresh-water swamp.

The south-west point of Flinders island lies S.E. by S. 1¼ miles from the south extreme of the hilly projection just described, and has a small bight on either side of it.

Strzelecki Peaks.—At N. by E. 3 miles from the south-west point of Flinders island, Strzelecki peaks the highest mountains on the island, rise to the height of 2,550 feet.

Reef Isles are four in number, with several rocks above water, connected by reefs extending from 3 miles westward to 4¾ miles S. by W. ½ W. from Long point. Chalky island, the northernmost is three-quarters of a mile long, North and South, and is enclosed by rocky shoals, extending farthest from its south point; but the island should not be approached on its west side, within a mile in 10 and 11 fathoms water. The other three, which are small islets, lie respectively S.E. by E. 2 miles, S. by E. ½ E. 2½ miles, and S. by E. ¾ E. 4½ miles from the northernmost island, and are connected by a narrow continuous reef, extending south-westward from the easternmost to the westernmost, and from thence south-eastward to the southernmost islet.

Another small island, Isabella, lies South 1¾ miles from Long point, between which and Reef isles there are 4 and 5 fathoms water; the depth decreases northward to 2 fathoms abreast of Long point. Between this island and the coast to the eastward of it, the space appears to have been little sounded, only showing 6 to 9 feet water at half a mile and three-quarters of a mile from the shore.

Soundings.—There is a clear channel nearly 2 miles wide, with 8 to 10 fathoms water, between the northern end of Hummock island and the islets off Settlement point; and another 5 miles wide, between the island and Reef islets; the soundings gradually increasing southward, to 21 fathoms between Low (Passage) islets and the southernmost Reef islet.

TIDES.—The tide streams in this channel nearly follow the trend of Hummock island, the flood setting to the southward, three-quarters of a knot, and the ebb to the northward, half a knot.

Kangaroo Island, the centre of which lies S. by E. ½ E. 5 miles from the summit of Chalky island, the northernmost Reef isle, is of a crescent form, with its points to the southward and south-eastward, each having a reef projecting a short distance from it. This island is 1½ miles long N.E. and S.W., and one-third of a mile broad at the centre. Reefs extend 2 and 3 cables from its north-west side and north-east point, and for a mile to the northward.

Anchorage.—There is anchorage in 7 fathoms water, off the north-east end of this island.

Green Island, of which the centre lies E. ½ N. 3 miles from the north-east point of Kangaroo island, is 1½ miles long, North and South, and one-third of a mile broad at the centre, where it rises to a hill. A cluster of islets extends nearly a mile northward from the north end of the island.

There is deep water close round the rocks which skirt the southern half of Green island, but there are only 2½ to 1½ fathoms along the southern edge of a shoal which connects the island with the mainland.

Anchorage.—There is anchorage in 4 fathoms water, at about one-third of a mile off the south-east side of the island.

Soundings.—There are 7 to 13 fathoms water between Kangaroo and Green islands, from whence the depth gradually decreases northward, to 4 and 5 fathoms between the easternmost Reef islet and Isabella island to the eastward of it.

CHAPPELL ISLANDS are three in number, with numerous islets and rocks, lying S.W. by W. ¾ W. 5 to 12 miles from the south-west point of Flinders island.

GOOSE ISLE,* the westernmost of the group, which lies S.W. by W. ¾ W. 12 miles from the south-west point of Flinders island, is 1½ miles long, N.N.W. and S.S.E., and half a mile broad, with an islet about a quarter of mile in extent, and surrounded by a reef, close off its north-west extreme. The island is 54 feet high at its highest and northern part and consists of granite boulders with a shallow covering of soil in the hollows where a few sheep are grazed. There are 6 fathoms water close to the south point, and 7 to 9 fathoms near the east side of Goose isle.

Anchorage may be obtained in 9 to 11 fathoms, sand, to the eastward of Goose island, with the northernmost of the lighthouse-keepers dwellings in line with the flagstaff; and Hummock island open of the north-east point of Goose island. This anchorage is good during westerly winds, but being so close to the shore, would be unsafe, should the wind shift to the south-east.

Tides.—It is high water, full and change, at Goose island at 10h. 48m., springs rise 9 feet. The flood stream sets to the N.W., the ebb to the S.E., with an average rate of one knot.

LIGHT.—The lighthouse on Goose isle, which is situated at a quarter of a mile from its south point, is 74 feet high, the upper part being red and the lower white; it exhibits at the height of 100 feet above the sea, a *fixed* light, visible from the westward between the bearings of S.S.E. ½ E and N.W. ½ W., at the distance of 14 miles. To the eastward of these bearings the light is from many points of view, eclipsed by intervening islands.

Badger Island, the central and largest of the Chappell islands, is flat, about 4 miles in extent, 109 feet high at its N.E. point, and sparsely covered with timber. A rocky spit with 12 feet upon it extends nearly 1½ miles to the northward of its north-west extreme. The north-west and north-east points lie nearly E. by N., the former 2 miles, and the latter 4½ miles from the north point of Goose isle. From the north-west point the western side of Badger island trends South three-quarters of a mile, and thence, forming a bay half a mile in depth, S.S.E. 1½ miles to Unicorn point, the south-west point of the island, from whence the southern and eastern shores of the island sweep round 4 miles to its north-east point. Over Unicorn point, there is a conspicuous granite boulder. The north side forms a bay extending from the north-east point W. ½ S. 1½ miles, and having 9 to 3 fathoms across its entrance. The western point of this bay has a reef projecting nearly two-thirds of a mile northward from it, between which and the north-west point of the island is a projecting point fringed by a reef. At a quarter of a mile to the eastward of the east point of Badger island is Little Badger island, 17 feet high, and at 1¼ miles to the south-eastward of the south-east point of Badger island is Beagle island, 21 feet high, having several off-lying rocks to the northward, and a sunken rock a quarter of a mile to the southward of it.

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* *See* Admiralty chart of Banks strait, No. 1,706; scale, m = 0·5 of an inch.

Anchorage.—To the eastward of Badger island, good anchorage may be obtained in about 7 fathoms, sandy bottom, with Little Badger island in line with the summit of Mount Chappell island.

The channel between Goose and Badger islands, which is 1¾ miles wide, has 7 to 19 fathoms water in it.

Boxen island, and Double rock.—Boxen island, 22 feet high, lies S.E. by E. ¼ E. 6 miles from Goose island lighthouse, having rocks and foul ground all round it, but principally on its western and northern sides, where they are distant a quarter of a mile. Double rock, 34 feet high, lies one mile N.W. ½ N. from Boxen island. Three cables from Double rock in a north-westerly direction is a rock, dry at low-water springs.

Beagle island, N.N.E. ½ E. nearly 2 miles from Double rock, is 21 feet high, with a reef for a quarter of a mile off its western side. A 3½ fathoms bank extends off its north side for half a mile, on which are several rocks above water.

Nearly midway between Double rock and Beagle island, lies Rochfort rock with 6 feet water, on which the sea breaks in westerly winds during low tides.

Mount Chappell island, 1½ miles in length N. ½ E. and S. ½ W., and three-quarters of a mile in breadth, lies one mile north-east of Badger island, and rises to a rounded summit 653 feet high. To the westward, and extending northward for 2½ miles and north-eastward for half a mile of this island there are several groups of rocks 15 to 25 feet high, the highest bearing N.W. by N. distant 1¼ miles from the north end of the island; a shoal patch with 4¼ fathoms water on it, which breaks in heavy westerly weather, lies at 1½ miles N.E. by E. from the north-east end of the island; and in the centre of the channel between Mount Chappell and

Badger islands lies a rock which dries 3 feet at low water. Mount Chappell island is the favourite breeding place of the mutton bird or sooty petrel, and during the season above 200 men, women, and children are employed in salting the young birds (which form an article of diet amongst the poorer population in Tasmania) and collecting their oil, which is used for softening leather, lubricating machinery, and other purposes. The birds deposit their eggs about the 25th, 26th, and two or three following days of November. The season for obtaining the young birds and oil is from January to March.

Southern Shore of Flinders island.—From the south-western point of Flinders island, the coast trends south-easterly 1½ miles E.S.E. 2¼ miles, East 1½ miles, and N.E. by E. 3½ miles to Badger corner, the whole distance being occupied by numerous small sandy bays and sharp projecting points, the spurs from Strzelecki peaks generally extending to the points.

The dangers near this part of Flinders island are Entrance rock with 2 feet water, lying S. by W. ¼ W. 1½ miles from the S.W. point; a rock with 12 feet, nearer the point; a bank with 12 feet, lying a mile off shore; and a shoal of 9 feet, extending from the shore to a distance of half a mile.

Badger Corner is a small cove in the western corner of a bay, which extends from the south-east point of the cove E.N.E. 4 miles, and is 1¾ miles deep. This bay is mostly occupied by small islands and shoals, with generally very shallow water between them, and is fronted by the two Dog isles.

Between the western Dog isle and Badger corner there is a group of rocks covered at high water, to the westward of which is a narrow channel, with 12 feet water, leading to the anchorage for small vessels in Badger corner; the channel to the eastward of these rocks is blind.

Dog isles are situated between Badger corner and the S.E. point of Flinders island. The western isle, about half a mile across and 118 feet high, lies E. by S. 6 cables from the S.E. point of Badger corner. Shoal water extends from it in a south-westerly direction 1½ miles; a rock 3 feet high lies 2 cables from its south extreme; and another 1½ cables from its north-west extreme. Other rocks, with numerous sand-banks, lie to the northward, and a sandy flat, nearly dry at low water, extends half a mile to the north-eastward.

The eastern and larger isle lying nearly one mile from the western isle, is about 1¾ miles in extent, having a flat-topped, conspicuous hill 254 feet high over its north-west point; there is a shoal sandy bay to the eastward of the south-west point of the isle, dry at low water except near the centre, where there is a depth of 3 feet; at the head of this bay there is a house occupied by the lessee of the island, off which small vessels anchor.

At 6 cables E.S.E. of the south-west point is a rock 2 feet above high water, from which a sand-bank extends nearly half a mile to the eastward, parallel to and at a distance of a quarter of a mile from the southern shore of the island. Three-quarters of a mile to the northward of the eastern isle is Little Green island, and one mile N.E. of the north-east point of the isle is a sandy point of Flinders island, from which the shore trends E.N.E. and north-easterly for 3 miles to the south-east extreme of Flinders island, thence in a northerly direction to the mouth of a lagoon extending above 2 miles to the north-westward, and nearly 2 miles to the south-westward from its mouth. From the north-east point of the eastern isle shoal water extends almost to the nearest point of Flinders island. In the depth of the bay north of Dog isles there is a small river named Samphire river. Midway between Dog and Vansittart islands is a rocky islet, with shoal water extending more than a quarter of a mile to the northward; the remainder of the space between Dog, Vansittart, and Flinders islands is clear of danger, with 6 to 25 fathoms water.

North-east Shore of Flinders Island.—From the north point of Flinders island, which lies N.E. by E. ½ E. 5 miles from the north-west point, the north-east side of the island trends in a direct line of sandy beach S.E. ½ E. 17 miles to a small inlet, and from thence East 5½ miles to the east point of the island. Small reefs project from the shore between the inlet and the point.

Aspect.—Quoin hill, S. by W. 3½ miles from the north point of Flinders island, rises to the height of 730 feet; but there are no conspicuous objects along this coast between this hill and the Patriarchs, three remarkable peaks, rising from the low sandy land behind the east point of the island, and separated from the mountainous ranges to the westward by a low sandy plain. The north-easternmost and most elevated of the Patriarchs bears S.E. ½ E., distant 19 miles from the north point of Flinders island, and is 830 feet high.

Beagle Spit.—At about 3½ miles to the south-eastward of the north point of Flinders island a dangerous sandy spit stretches out from the shore 5½ miles in an east-north-east direction, with only 9 feet water on a patch at 1¾ miles within its extremity, where the depth is 18 feet: from the north-east extreme of this spit the north point of Flinders island bears W. ½ N., distant 7½ miles.

Soundings.—There are soundings in 10 to 21 fathoms between the Sisters and the end of the spit, off which there are 10 to 8 fathoms; and from 7 fathoms at two-thirds of a mile S.E. of it, there are regular soundings in 12 and 13 fathoms to Babel isles, off the east point of the island.

At 3 miles to the eastward of the north-eastern Sister isle there are 18 fathoms, and from thence they decrease to 12 and increase again to 22 fathoms to 3 miles north-eastward of Babel isles.

BABEL ISLES, so named by Captain Flinders from the discordant and various notes of the innumerable birds on them, lie E.N.E. between one and 3 miles from the east point of Flinders island and consist of one principal island, nearly 2 miles long, North and South, and two rocky islets lying close off its south-east side. The former is partially covered with tufted grass and brushwood, and has a remarkable pyramidal hill near its northern end, which is almost separated from the rest of the island by a deep notch. This pyramid bears from the north-eastern Patriarch N.E. by E., distant 6 miles. The intermediate space contains small dry rocks surrounded with breakers nearly midway, and is otherwise so contracted by shoal spits of sand, which project from each side, as to preclude the possibility of any vessel using it.

The other isles of this cluster are low, rocky, and very small, with no safe passage among them, except for boats; but they are safe to approach on the east side, having 17 fathoms water at half a mile off.

The whole group is much frequented by shags, sooty petrels, and other sea birds, and was the resort of numerous seals.

Anchorage.—In north-west winds, a vessel might anchor on the south-west side of Babel isles, sheltered by the sandy spit extending from Flinders island.

TIDES.—It is high water, full and change, at the Babel isles, at 10h. 5m.; springs rise 7 feet. The north-east stream begins here.

The Eastern Shore of Flinders island, from the east point, trends S.S.E. 15 miles, in nearly a direct line of sandy beach, to the south-east extreme of the island. There are no remarkable objects along this shore, but there are several swamps and lagoons; the northern of the two lagoons lying between the Patriachs and the shore, and the other close to the shore at 7 miles to the southward of the east point.

FRANKLIN SOUND, 4 miles wide, between Flinders and Barren islands, is fronted to the westward by the Chappell islands; the only navigable channel into this sound from the westward is between Flinders island and the Oyster rocks. A bar with 3½ to 6 fathoms extends across its entrance; the summit of Vansittart island in line with the south point of Flinders island bearing E. by N. leads over the bar in 4½ fathoms water. A quarter of a mile south of this leading mark on the bar there is 14 feet water, at half a mile south 10 feet; and on the north side at a quarter of a mile distance 12 feet. After crossing the bar the only danger to be avoided is a sand-bank with patches of 8 and 11 feet, parallel

4 miles to Puncheon point, the north point of Barren island; several islands and rocks surrounded with sandy flats lie westward and south-westward of this point over a space of more than a mile.

Vansittart Island, locally known as Gun-carriage, the south point of which lies W. by S. ½ S. one mile from the north point of Barren island, is 2½ miles long, N.N.W. and S.S.E., and 1¾ miles broad at its southern end, and almost connected with Puncheon point at low water, rising at its centre to a broad summit 550 feet high, from which a spur extends to its south-west point. On the west side there is a sandy bay, where the owner of the island resides.

To the southward of a line from Apple Orchard point to the south-west point of Vansittart island, there are numerous shoals dry at low water.

Vansittart shoals.—The Eastern entrance to Franklin sound lies between sand-banks extending from the south-east point of Flinders island and others extending from Vansittart island; these banks have been named Vansittart shoals. The channels between them are said to shift with every strong wind. The best and probably the most permanent channel was found to have a depth of 4 fathoms. The shifting channel along the Flinders island shore was very narrow. Northerly and north-easterly winds are said to have the greatest effect in shifting the Vansittart shoals. The sea breaks heavily in easterly weather.

TIDES.—At the eastern entrance of Franklin sound there is a meeting of the flood streams, one coming from the N.N.E., and the other from S.E. The flood stream sets to the westward through Franklin sound, and from thence about W.N.W. on the north side, and W.S.W. on the south side of Chappell islands; and the ebb in the contrary direction. In the northern channel the streams run 2 to 2½ knots.

West coast of Barren island is a rock-bound coast trending 2 miles in a S. by E. direction, from a point one mile to the southward of the west extreme of Long island to cape Sir John. At one mile from the coast, and 2 miles from the south-west point of Long island is a rock 7 feet high, from which foul ground extends nearly half a mile in a north-westerly and south-westerly direction.

Cape Sir John, the south-west extreme of Barren island, has three off-lying rocks above water, situated respectively S.W. ½ W. three-quarters of a mile, S.E. ½ S. three-quarters of a mile, and E. by S. half a mile from the cape. One mile to the northward of cape Sir John is a conspicuous round-topped hill 530 feet high.

The Coast from cape Sir John, recedes to the north-eastward, forming a bay (Thunder and Lightning bay), nearly a mile deep, and

1¼ miles wide. An islet 58 feet high, and nearly connected with the shore, lies a quarter of a mile S.E. from the east entrance point of Thunder and Lightning bay. Eastward of this islet is another small bay, the south point of which lies E. by S. three-quarters of a mile from the islet, and has numerous boulders lying off it to a distance of a quarter of a mile; thence the coast trends south-easterly half a mile, and easterly 2 miles to a point 3 cables to the southward of which lies Malms rock, dry at low water. The latter part has numerous rocks off it to a distance of a quarter of a mile.

Wombat point, locally known as Rocky head, lies E. ½ N. 2½ miles from the point north of Malms rock; near the extremity of Wombat point is a small granite island 74 feet high, 1½ cables south, and 1½ cables east of which there is a rock uncovering at one-third ebb, and to the south-westward at three-quarters of a mile is a sand-bank with 2½ fathoms water.

Sloping point bears E. ½ N. 4 miles from Wombat point; between these points is a shoal bay having near its centre an island about 20 feet high, named Battery island. A rock awash at low water lies one cable south of Sloping point, and another above water lies nearer the shore.

Middle bank is a long, narrow shoal, fronting the bay just noticed, the east end of which in 3 fathoms lies S.W. by W. half a mile from Sloping point; whence it extends W.S.W. 2 miles, with as little as 3 feet on the shoalest part.

KENT BAY extends from Sloping point E. ½ S. 5½ miles to Passage point, the south point of Barren island, and is 3 miles deep; it is nearly filled with shoals, and the only anchorage is in 11 fathoms water, 3 cables from the shore, 1¼ miles N.E. by E. from Sloping point. Abreast this anchorage is the most convenient place for watering. From Sloping point the north-western shore trends N.E. ½ N. 3 miles to a small point, at E. by N. ¾ N. three-quarters of a mile from which a projection of the northern shore divides the head of the bay into two bights. A narrow shoal upwards of 2 miles long in an E. ½ S. and W. ½ N. direction, with from 3 to 18 feet water on it, lies across the mouth of the bay; its Western end bearing E.N.E. about 1¾ miles from Sloping point. There is a clear channel of half a mile wide between the south edge of this shoal and the 3-fathoms edge of the bank to the southward.

Sloop Rock, N.E. ½ E. nearly 2¼ miles from Sloping point, is situated on a reef of rocks. Sloop rock is 12 feet high, and lies about 4 cables from the west shore of Kent bay.

Anchorage.—Small vessels may anchor between Sloop rock and the shore in 3 to 6 fathoms. Several vessels may here lie at anchor in 4 or 5 fathoms, sheltered from all winds. From this anchorage the soundings decrease to one fathom at three-quarters of a mile northward of Sloop rock; and between the rock and the head of the bay, there are irregular soundings of 4 to 2 fathoms.

The eastern bight of Kent bay—where there was a run of fresh water—is filled by a shoal flat, which extends in patches along the eastern shore, nearly to Passage point.

East Coast of Barren island.—From Puncheon point the coast trends S.E. by E, ¼ E., 7½ miles (with several rocky points and intermediate sandy bays) to Harley point, off which several rocks above and below water extend E.S.E. nearly half a mile, thence at a distance of nearly a mile S.E. by E. ¾ E. is Flat rock 3 feet high, with a few sunken rocks extending to the north-westward. Harley point is nearly separated from the land behind by a lagoon. There are lagoons behind the beach, at intervals for 3½ miles to the south-eastward of Puncheon point, and at 2 miles to the north-westward of Harley point, is an inlet barred across at its entrance.

Cape Barren, the east point of Barren island. S.E. by S. 3½ miles from Harley point, is a rounded rocky point having numerous hillocks over it; at three-quarters of a mile to the eastward of the cape lies a rocky islet 40 feet high, named Gull islet; and at one mile East is Gull rock 12 feet high, with numerous other rocks above and below water extending nearly half a mile in a northerly direction. Midway between cape Barren and Gull islet is a sunken rocky patch with 14 feet over it. There are 17 fathoms water at half a mile to the eastward of Gull islet; but there are strong tide ripples near the reef. At 1¼ miles S.E. by E. from cape Barren there is a patch with 6½ to 8 fathoms water on it.

Between Harley point and cape Barren, the coast forms a double bay.

Cone point, so named from two conspicuous, cone-shaped granite rocks, lies S.W. ¼ S. 5 miles from cape Barren, with two bays between, having sandy beaches in their depths. The point dividing the bays has a conspicuous sand-patch over it.

The north-eastern bay extends 3 miles from cape Barren, and is one mile deep. The south-western bay is two-thirds of a mile deep, with a lagoon extending 1¼ miles along the back of the beach, at about half a mile from it.

Soundings.—From 7 fathoms, at 2 miles eastward of the north point of Barren island the soundings increase to 14 fathoms at 1½ miles off the north-east point, and 17 fathoms at 1½ miles off cape Barren; from thence to about 3 miles eastward of Cone point there are 13 to 17 fathoms.

Passage Point, the south extremity of Barren island, lies W. by S. ½ S., 2 miles from Cone point, having a bay with a steep sandy beach lying between, the bay is nearly one mile deep, with 7 to 9 fathoms water in it. Behind the sandy beach on the west side of this bay is a lagoon, the water in which is of a red colour and a little brackish. On the west side of Passage point there are several smaller ponds, which contain good water.

Mount Kerford, 1,644 feet high, is the highest peak of the range which rises from the various points on the south-east shore of Barren island. The whole range is conspicuous from its barren and whitish appearance.

ARMSTRONG channel, between Barren and Clarke islands is seldom used owing to its numerous banks and strong tides. The northern passage of Armstrong channel is neither so wide nor so straight as that along the Clarke island shore. At the west entrance, the passage between Barren island and Preservation isle is about half a mile wide; E.N.E. nearly 1½ miles from the north point of Preservation isle, lies Malms rock, between which and Wombat point, and extending a mile from the shore, is a shoal bank interspersed with rocks, above and below water. The passage between Preservation isle and Clarke island is nearly 2 miles wide; the only dangers in the entrance of this passage are, Eclipse rock off the west point of Clarke island, *see* page 423, a rock awash a quarter of a mile off the same point, and the 2-fathoms rock to the south-eastward of Rum islet; the better side of the channel is along the Clarke island shore; care, however, is necessary to give the shore northward of Clarke hill a berth of half a mile, and again to approach the next point, (the western point of Kangaroo bay,) to avoid the Middle bank with 3 feet upon it which lies in mid-channel.

Westward of Seal point, the north-east extreme of Clarke island, lies Kangaroo bay, one mile deep, having a narrow channel leading into it along the western shore, and anchorage may be obtained in the centre of the bay in 3 or 3½ fathoms, the remaining portion of the bay is shoal.

From the western point of Kangaroo bay Armstrong channel runs in the direction of Sloping point, between which and Seal point there is a depth of 41 fathoms in mid-channel.

From half a mile N.E. of Seal rocks, 8 feet high, on the north-west side of Seal point, several sand-banks (dry at low water) and shoals extend to Forsyth isle. North of these shoals Armstrong channel continues (with a narrow shoal sand-bank occupying a central position), and terminates in a passage 4 cables wide between Forsyth and Passage isles. A smaller passage exists between Passage isle and Barren island, but should only be used in case of necessity as the tides run at the rate of 5 or 6 knots, and its centre is occupied by a half-tide rock. It should be entered with a flood tide, keeping near the Barren island shore.

Night islet, 46 feet high, lies S.E. by E. 14½ miles from Goose island lighthouse. Dry and sunken rocks, nearly half a mile in extent, lie half a mile from it in a north-easterly direction; and the southern islet, named Little Night islet, lies half a mile in a S. by E. direction, and bears from Goose island lighthouse S.E. ¾ E. 15 miles.

Preservation isle, 84 feet high, in the west entrance of Armstrong channel, is of granite formation, 1¾ miles long in a north-west and south-east direction, and half a mile across its broadest part. Many small islets and rocks extend half a mile from its north-west extreme, and from its east side a shoal spit, partially dry at low-water spring tides, extends to a distance of 1½ miles.

Rum Islet, which lies close to the south point of Preservation isle, is about a quarter of a mile in extent; it has a reef projecting a short distance from its southern end, and is joined to Preservation isle by a reef of dry and covered rocks, which, together with the islet, protects Hamilton road from the south-westward. A rock with 2 fathoms water on it at nearly East 4 cables from the south point of Rum islet, lies in the track of vessels bound into Hamilton road.

Hamilton road, to the eastward of the south-east point of Preservation isle, affords anchorage in 4 fathoms water, 3 cables from the point; in this vicinity there are patches of 3 fathoms. After a continuance of heavy gales from the westward a long swell rolls round the south point of Rum islet, and it was observed that the swell did not gradually increase but set in suddenly, compelling the *Victoria* surveying vessel to get under weigh and run for shelter to Kent bay, where she rode out the remainder of the gale.

Tides.—It is high water, full and change, at Preservation isle at 10h. 36m.; springs rise from 5 to 7 feet.

Seal Rocks are a cluster of dry and sunken rocks on a shoal projecting to the north-west about one-third of a mile from Seal point, the north-east point of Clarke island, leaving a channel two-thirds of a mile wide, between them and Sloping point.

Forsyth isle is 1½ miles long, North and South, and one-third of a mile broad. The bank which forms the southern side of Armstrong channel extends 1½ miles north of Forsyth isle, thence in a westerly direction towards Sloping point; and numerous banks and channels exist between Forsyth isle and Clarke island. A sand-bank extends 3 cables from the east side of Forsyth isle, and a shoal of 3½ fathoms extends nearly a mile to the eastward of the south-east point, and almost unites with another shoal extending S.W. from the south point of Passage isle. At one mile S.W. ¾ S. from the south-west point of Forsyth isle lies a rock awash at half tide. In the vicinity of the shoal water the sea breaks heavily.

Passage isle, 77 feet high, so named from its forming one side of the eastern passage into Armstrong channel, lies 3 cables from the southern point of Barren island; it is 1¾ miles long N.W. by N. and S.E. by S., and about half a mile broad. At one cable from its north-east point, and nearly in mid-channel, is a rock dry at low water, and at 2 cables north of its north point are several rocks above water.

A few rocks above water extend one cable off the south point, and rocks having less than 6 feet water extend a quarter of a mile S.E. from the south-east extreme. Off the western side a sand-bank extends 4 cables from the shore, except off the north-west point, where the passage is deep.

Remarks.—Although there are many shoals of sand in as well as on each side of the wider parts of Armstrong channel, a passage of sufficient width and depth is swept out by the tide streams for vessels to go through. The bottom is either rocky or sandy; rocky in the deep and narrow parts, and sandy in the bights and shoaler places. A careful study of the chart, with a good look-out, and attention to the lead are the safest and best guides for this channel.

Water.—Good fresh water may be collected, at certain seasons, in small pools near the south-eastern end of Preservation isle; but that which drains from the rocks appears to possess some pernicious qualities, as it was first used by the wrecked crew of the ship *Sydney Cove* until several of them died. Small pools or runs of water are to be found almost everywhere under the high parts of Barren island, and it is probable there may be some on Clarke island.

Birds.—Preservation isle and the adjacent rocky islets are visited by numerous sea birds, including the barnacle goose, a few black swans, and great numbers of the sooty petrel; which latter burrow in the ground like rabbits, and when skinned and smoked, are passable food.

Clarke island, the southernmost of the Furneaux group, 8 miles long, N.E. ¾ N. and S.W. ¾ S., and 6 miles across its south-western part, rises near its northern shore to a peaked hill 676 feet high; and a broad-topped hill 525 feet high is situated near its south-west extreme. The west point of Clarke island is rocky, and at half a mile from it in a westerly direction is the Eclipse rock with 11 feet, about which there is a confused sea. Sloping point open north of Clarke island bearing N.E. ¾ E., leads to the northward and a conspicuous boulder on a hill 780 feet high, near the west end of Barren island, open west of Rum island, N.N.W. leads to the westward of Eclipse rock. *See* page 421.

Southward of the west point is a deep bay, which was formerly much used by coasting vessels, but cannot be recommended.

A few scattered rocks lie off Look-out head (the south-west point of Clarke island) to the south-eastward and eastward; the outer is distant 3 cables from the shore, and is 2 feet above high water. Between Lookout head and the south point of Clarke island, which lies E. by S. ½ S. 2¾ miles from the head, the south-west coast of the island forms an exposed bay one mile deep, with reefs extending about one-third of a mile from the north-west and eastern shores of the bay.

The south point of Clarke island is enclosed by a reef of sunken rocks, between which and Moriarty point the south-east extreme of the island, at N.E. by E. one mile from the south point, there is a small exposed bight. From the south point of Clarke island Swan isle lighthouse bears S. ½ W., 8½ miles.

The south-east point of Clarke island (Moriarty point) lies N.E. by E. ¾ E. three-quarters of a mile from the south point, thence the east coast of Clarke island trends in a N. by E. direction for 7 miles to Seal point, its N.E. extreme.

Moriarty bay, lying to the northward of Moriarty point, has bad holding ground, on a broken rocky bottom; there is good landing in a corner of the bay, but the whole of this vicinity should be avoided.

Look-out rock, 60 feet high, lies S.E. by E., 5 miles from Little Night islet, and three-quarters of a mile W.N.W. from Look-out head, between which and Look-out rock is the Napper rock, awash at high water.

A rock lies about a quarter of a mile N.W. by N. from Look-out rock.

Moriarty rocks.—At 3¾ miles E. by N. from Moriarty point lies the outer of two rocks, named Moriarty rocks from their proximity to the Moriarty bank; the outer or S.E. rock is 20 feet high, and the N.W. rock, 25 feet high. At 2 miles N.W. by W. from Moriarty rocks are two rocks 20 and 15 feet high, with several smaller rocks above and below water near them.

Moriarty banks.—The western of these banks extends in a S.W. by W. direction nearly 2½ miles from the highest Moriarty rock; the least water upon it is one foot, but the general depth is about 9 feet. The eastern tail of the east bank lies E.S.E. 2¼ miles from the same rock; the least water found on it was 16 feet: to the northward and westward of the east bank is another bank, the least water upon which is 15 feet. A fourth bank extends in a N.E. by N. and S.W. by S. direction from the two rocks which lie N.W. by W. nearly 2 miles from the Moriarty rocks; this bank, which has a sunken rock at its north-easterly termination, is nearly 2½ miles long. Nearly midway between it and the shore is a half-tide rock.

Caution.—The whole of the space included between the east shore of Clarke island, the Moriarty rocks, and Passage and Forsyth isles is either foul ground, or the strong tides cause such a race and heavy break as to make the place very dangerous.

Clearing Marks.—Mount William, 730 feet high, near the north-east coast of Tasmania, bearing S. ¾ W. clears the outer, or eastern end of Moriarty banks; and to pass to the southward of it, the south point of Clarke island must not be brought to the southward of W. by N.

The Soundings in Bass strait are tolerably regular, ranging from 30 to 48 fathoms, with generally 5 fathoms within a mile of its shores. The bottom mostly consists of sand and shells in the north-western and greater portion, and more of mud, marl, and ooze in the south-eastern part of the strait.

Eastward of Bass strait.—Between 35 fathoms at 20 miles eastward of the south extreme of Barren island, and 38 fathoms at about 40 miles north-eastward of the north point of Flinders island, the depths range from 20 to 42 fathoms, and thence the soundings deepen rapidly to more than 200 fathoms in the direction of Rame head and cape Howe.

ANCHORAGES in BASS STRAIT, when going Eastward.—The most convenient places for anchoring in this strait, with foul winds, when going to the eastward, are:—

1st. Franklin road, under the north-west end of King island, where, the heavy sea being broken off by the New Year isles the shelter from easterly winds must certainly be much more complete.

2nd. Port Phillip; anchoring just within the entrance, on the south side. When a fair wind comes, a ship can get out of the port by means of the strong tide streams.

3rd. Off the north-west extreme of Tasmania, between Three Hummock and Hunter islands; taking care not to anchor too near to the weather shore, lest the wind change suddenly.

4th. The bight between Wilson promontory and cape Liptrap, in case of necessity; but it is a place not to be recommended, from its being very dangerous should the wind shift to S.W.

5th. Kent group, for small vessels; in one of the small sandy coves under the eastern island.

6th. Furneaux group, between Clarke and Preservation islands. If the ship be not able to weather Clarke island, and pass out to the south-eastward, when the wind comes fair, she may run through Armstrong channel, with a boat ahead and a good look-out.

When going Westward.—In case of foul winds, which, if the weather be thick or rainy, may be expected to fix at S.W. and blow strong, there are many places where a ship may anchor, to wait a change; but the following appear to be the most convenient:—

1st. West cove, in Erith island, one of the Kent group.

2nd. Hamilton road, at the east end of Preservation isle. Also on the east side of Hummock island.

3rd. Western port, under Phillip island; anchoring so soon as the ship is sheltered. A fair wind for going onward through the strait will take a ship out of this port.

4th. Port Phillip.

5th. Sea Elephant bay, on the east side of King island, where there is fresh water; or under the north-east end of that island, if the wind be from S.W.

And on the north coast of Tasmania there is anchorage:—

1st. On the south side of the largest Swan isle for small vessels, Mussel Roe bay, or under Waterhouse isle, 22 miles farther to the westward.

2nd. Port Dalrymple.

3rd. Port Sorell; but it is accessible only to small vessels.

4th. Various places among the Hunter group.

CHAPTER VI.

TASMANIA.—NORTH AND WEST COASTS.

VARIATION, in 1884.

Cape Portland	9° 30′ E.	Macquarie harbour	8° 50′ E.
Cape Grim	8° 20′ E.	South West cape	9° 5′ E.

TASMANIA, lying to the southward of Australia, was discovered in the year 1642, by the celebrated Dutch navigator Tasman, who bestowed on it the name of Van Diemen Land, in honour of the Governor-General of the Dutch possessions in the East. It is of considerable extent, being situated between the parallels of 40° 33′ and 43° 39′ S., and between the meridians 144° 38′ and 148° 22′ E., and is separated from the southern part of New South Wales by Bass strait.*

The north coast of Tasmania forms the south side of Bass strait, and occupies an extent of about 165 miles between Eddystone point and cape Grim, its north-east and north-west points; and near the bottom of the bight, which it forms by curving to the southward, are ports Dalrymple and Sorell, the former being the embouchure of the river Tamar. The whole of this shore lies generally in very smooth water, the prevailing winds being off the land, and the long south-westerly swell outside being interrupted by the islands at the western entrance of the strait. Its navigation is represented to be free from dangers to within a mile of the shore and of the islands which lie off it; except in the neighbourhood of port Dalrymple, where on the Hebe reef, lying 1½ miles from the land, the ship of that name was lost in 1808.

The north-east extreme of Tasmania is low, with a coast-range of sandhills; from this level part, rise mounts Cameron and William, the loftiest of a group of peaks cresting a ridge; the latter is used as a guide for vessels working through Banks strait.

The population of Tasmania in 1881 was 115,705, consisting of 61,162 males, and 54,543 females. The aboriginal inhabitants have become quite extinct.

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* *See* Admiralty charts :—Bass strait, Nos. 1,695 a; and 1,695 b; scale, m = 0·2 of an inch; Banks strait, No. 1,706; scale, m = 0·5 of an inch; and general chart of Tasmania, with plan of D'Entrecasteaux channel, and approaches to Derwent river, No. 1,079; scale, m = 0·11 of an inch.

Commerce.—The commerce of Tasmania is almost entirely with the United Kingdom and the Australian colonies, the latter being chiefly Victoria and New South Wales. The number of vessels registered and belonging to Tasmania in 1881, was:—203 sailing vessels of 17,733 tons and 20 steam-vessels of 4,681 tons. Among the natural productions of Tasmania are gold, iron ore, coal of good quality and easily accessible, and tin. In 1881 the Imports amounted to 1,431,144*l.*; the Exports to 1,555,376*l.*

Telegraphs.—There is a sub-marine cable between Tasmania and Victoria, whence land-lines extend to New South Wales, Queensland, and South Australia; a line from port Adelaide (in South Australia) to port Darwin connects the line *viâ* Java with England. There are 85 stations and 1,152 miles of wire in Tasmania.

Mails.—There is a regular mail communication fortnightly between Hobart, Sydney and Launceston, and at shorter intervals between Hobart and Melbourne, and Launceston and Melbourne. Steam-vessels leave also at regular intervals for Melbourne and New Zealand ports.

EDDYSTONE POINT, 81 feet high, the north-east extreme of Tasmania, forms the north point of Bay of Fires. At 4 cables S.E. by E. ½ E. from the extremity of the point is the Eddystone rock, 19 feet high, the southernmost of the Victoria rocks, having between it and the land two half-tide rocks. The easternmost of the Victoria rocks is named Norgate, and the northernmost Greyhound rock. Greyhound rock lies nearly two-thirds of a mile E.N.E. from Eddystone point and has only 5 feet water on it; Norgate rock lies about one mile East of the point, with 14 feet water on it.

At 2½ miles N.W. by N. from Eddystone point and one mile from the coast is a rock awash at low water, and at N.W. ½ W. three-quarters of a mile is a rock awash at high water.

On the north side of Eddystone point there is good landing. It is proposed to build a lighthouse on the point.

Tides.—It is high water, full and change, at Eddystone point at 8h. 10m.; springs rise 7 feet. The flood stream sets to the northward, the ebb to the southward, but neither stream has any particular strength to the southward of Banks strait.

Bay of Fires,* close south of Eddystone point, affords good shelter when the wind is steady from the westward, but should be left immediately there is a lull, as the wind often at the termination of a westerly gale shifts suddenly to the S.E. The anchorage is in 10 or 11 fathoms, near the centre of the bay. The water shoals suddenly when near the beach.

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* *See* Admiralty plan of Bay of Fires, on chart of Banks strait, No. 1,706.

Anson lake is situated in the southern part of Bay of Fires, and the entrance is so small as not to be discernable from seaward, and scarcely permits boats to enter even at high water. In the course of the survey, it was only upon one occasion that landing could be effected outside the entrance. At most times there is a dangerous heavy surf rolling on to the beach.

The COAST from Eddystone point trends N.W. ½ N., 10½ miles to cape Naturaliste, with several small points and bays between; off the points are numerous granite boulders, some of which are 20 feet high.

Cape Naturaliste, 71 feet high, is faced by sand-cliffs, but the coast about it is lower than that of Eddystone point.

Mounts Cameron, William, and Pearson, are the only remarkable hills in this vicinity; the highest peak of mount Cameron, 1,825 feet, lies S. by W. ¾ W. 17½ miles from Swan isle lighthouse. It is one of several peaks, and the summit is of a haycock form; the ridge, of which mount Cameron is the highest part, is over 3 miles in length in a north-east and south-west direction. Mount William, S.S.E. ½ E. 11½ miles from Swan isle lighthouse, rises gradually to a rounded summit 714 feet high. Mount Pearson, S.S.E. ½ E. 15¾ miles from Swan isle lighthouse, is a broad-topped hill 623 feet high.

George rocks are a group of granite boulders, the highest of which (64 feet high) lies N.N.W. 4 miles from Eddystone point; these rocks occupy a space of nearly a mile, and with the exception of the largest two are quite barren; scattered through the group are a few half-tide rocks, but most of the rocks are from 10 to 30 feet high.

The space between George rocks and the main is, with the exception of the rock awash at low water described at page 428, apparently clear, but masses of kelp along the shore and on the west side of George rocks give an appearance of hidden dangers, which may exist, though they have escaped detection.

Eucalyptus Rock, with 10 feet water, lies 3 miles from the shore, about 8 miles N.N.W. from Eddystone point; the sea rarely breaks on it, but the position may be known by kelp in the vicinity. Eddystone point open of George rocks bearing S. by E. ¾ E. leads between Eucalyptus and Salamander rocks.

Salamander rock.—This danger, with 10 feet over it, lies N.E. by E. 3½ miles from Eucalyptus rock, and E. by N. 5½ miles from the Black reef. No distinct break was ever seen on this rock. The south round hill of mount Cameron range open south of mount William bearing S.W. by W. leads to the southward, and the same hill well open north of mount William S.W. ½ W. leads to the northward of Salamander rock. The rock lies in the direct track of vessels between Melbourne and Hobart or New Zealand.

Black reef, 9 feet high, lies N.E. ¼ E. 1¼ miles from cape Naturaliste; rocks above water extend to a distance of one-third of a mile N.W. by W.; and at three-quarters of a mile E.S.E. is a rock above water, with sunken rocks around it. At 1⅓ miles N.W. ¼ W. from Black reef, lies Mussel rock with 6 feet, on which the sea sometimes breaks. Mount Pearson in line with cape Naturaliste bearing S. by E. ¼ E. leads to the westward of Mussel rock.

Soundings.—There are 41 fathoms at 5 miles and 42 fathoms at 13 miles off Eddystone point, and about 35 fathoms from the latter to the same distance off cape Barren, the bottom being rock at about midway, and sand to the northward. There are 23 fathoms at one mile eastward of George rock, and from Black reef to 8 miles E. by N. ½ N. from it, the soundings range from 14 to 21.

Mussel Roe point lies N.W. by W. ¾ W. 2½ miles from cape Naturaliste; to the east and north-east of this point there are many sunken rocks, and others awash at low water, the most outlying of which is situated E. ½ N. nearly three-quarters of a mile from the point.

From Mussel Roe point the coast trends south for nearly half a mile to the mouth of Mussel Roe river, which is small and only navigable for boats. From the mouth of this river the coast trends S.W., West, and N.W. for about 6 miles, forming the bay known as Mussel Roe bay.

Mussel Roe bay affords good anchorage in 6 or 7 fathoms, sandy bottom, in the north-western portion of the bay, with Swan isle lighthouse bearing about N. by W. Near the anchorage a sand-bank named Cockle bank, with 19 feet water, bears W.N.W. from Rocky head (Mussel Roe point) distant 2 miles. At 1½ miles S. by W. ¼ W. from the south point of Swan isle, is Tree point, the N.W. point of Mussel Roe bay, thence the coast trends in a westerly direction for 2 miles to Little Mussel river the mouth of which may be entered by boats at half tide; from Little Mussel river, the coast trends three-quarters of a mile in a north-westerly direction to a point made conspicuous by two bare sandhills.

Little Mussel bay, between Tree point and the last-mentioned point, is used by the smaller coasting vessels on account of the shoal anchorage; it is, however, much more exposed than Mussel Roe bay.

The Coast from the point north-west of Little Mussel river trends westerly 2½ miles to a point extending northwards in the direction of Foster islets, thence 1½ miles to cape Portland; this part of the coast is irregular, and has numerous shoals extending from it. Near cape Portland, between it and Foster islets, is a low islet, there are also other islets nearer the shore connected by ledges; the whole locality is very dangerous for boats on account of the confused sea. There is a good navigable channel between Swan isle and the coast just described, but in consequence of the strength of the tides it is well to give a wide berth to the foul ground extending from Swan isles and Foster islets. The leading mark mid-channel is mount William in line with rocky part of coast north of Mussel Roe bay bearing S.E. ½ S.

Cape PORTLAND, W. by S. ½ S. 8½ miles from Swan isle lighthouse, is low and rocky; on the most elevated part, which lies S.S.E. ¾ E. three-quarters of a mile from the extreme, there is a pile of stones erected at 119 feet above the sea; the coast from the cape trends in a S.S.E. direction, three-quarters of a mile, thence easterly half a mile and southerly 1½ miles, to a point which bears S. by E. ½ E. 2½ miles from the cape. At one-third of a mile N.W. of this point is an islet about 20 feet high, with another islet half a mile N.N.W. of it. These islets are too small to afford protection to the bay immediately east of them, and although used by small vessels it is only during a continuance of easterly winds; the best channel into the bay is between cape Portland and the northernmost islet; between the southern islet and the shore there is also a channel of 2½ fathoms.

The Coast from the point lying S. by E. ½ E. 2½ miles from cape Portland trends southerly one mile, and S.S.W. along a straight sandy beach 5½ miles to the mouth of Ringarooma river, thence continuing south-westerly for 2 miles with the same sandy beach, and W. by N. 4 miles with coast of a rocky formation to the mouth of Tomakawk river, whence it trends half a mile in a northerly direction to Tomahawk point close off which and connected with it at low water is Tomahawk island.

At three-quarters of a mile to the westward of Tomahawk point, there is a remarkable bare sand-hill.

SWAN isle, 109 feet high, lying 1½ miles off the N.E. coast of Tasmania, on the southern side of Banks strait, is of grey granite, but sand-hills covering the granite give it the appearance of being nearly all sand. At one-third of a mile West of the west point of the island is a sunken rock. A group of rocks, some of which uncover at low water springs, lies nearly 1½ miles in a N.W. by W. ½ W. direction from the lighthouse.

Little Swan isle lies N.W. by N. one mile from the west extreme of Swan isle, and at half a mile beyond in the same direction lies Cygnet isle. Between these isles are numerous rocks, some of which are above water.

Harry rock, lying N. by W. ½ W. one mile from Cygnet islet and N.W. by W. ¾ W., nearly 3 miles from Swan island lighthouse, has 16 feet over it at low water.

At one to 1¾ miles North of Swan isle, there is a race or overfall, but no shoaler water than 7 fathoms could be found.

LIGHT.—The lighthouse on Swan isle stands close to the water's edge, and exhibits at an elevation of 100 feet above the sea, a light *revolving every minute*. Visible in clear weather for 14 miles. The tower is round and 74 feet high, the upper part painted red and lower white.

Anchorage may be obtained off a small sandy bay on the south-east side of Swan isle; the bottom is sand over rock, or rock, the holding ground is therefore bad. The *Victoria* surveying steam-vessel lost an anchor there by fouling a rock, and dragged her anchor upon several occasions. Sailing vessels working through Banks strait from the eastward often get as far as Swan isle with the flood tide, and anchor during the strength of the ebb: but it is not advisable to anchor at Swan isle if westerly gales are expected, as it is not uncommon for the wind to veer to the south-eastward.*

Tides.—It is high water, full and change, at Swan isle at 9h. 16m.; springs rise 7 feet. The flood stream sets to the north-westward, the ebb to the south eastward, at the rate of 3 knots at spring tides, influenced however by the wind.

Foster islets, 47 feet high, situated W. ¾ S. 7 miles from Swan isle lighthouse, are two islets connected at low water. A shoal with 3 feet water extends 1¾ miles to the eastward, and a rock awash at low water lies N.N.W. ½ W. one mile from the islets; the sea breaks heavily upon this rock, and there is a heavy tide rip in the vicinity. There are 9 fathoms water at 1½ miles north-eastward of the outer Foster islet.

BANKS STRAIT, which separates the Furneaux group from the north-east part of Tasmania, may be said to lie between Goose island on the north-west, and Eddystone point, to the south-east. In the narrowest part of the strait (8½ miles wide) between Swan isles and Clarke island, the tide runs at the rate of 3 knots at springs; westerly winds accelerate the ebb stream, which runs to the eastward and occasionally attains a rate of 5 or 6 knots. With a head wind it is generally impossible for sailing vessels to work to the westward during ebb tide, and the custom is to anchor either under Swan isle, or in Mussel Roe bay, the latter anchorage being preferable, as the holding ground is not good at Swan isle anchorage. Occasionally small vessels anchor off Mussel Roe river, the water there being shoaler.

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* *See* Admiralty plan of Swan isles anchorage, Bass Strait, No. 1,695a; scale, $m = 0{\cdot}5$ of an inch.

The recent survey has proved the existence of many dangerous rocks, the navigation of Banks strait consequently requires great care. The bottom in Banks strait consists of sand, and in some parts rock.

DIRECTIONS.—In Banks strait the chief dangers to be avoided are apparently the reef which extends from Swan isles, and the foul ground and rocks to the northward of Foster islets. It may, however, be noticed that a vessel from the south-eastward, can close the shore when mount Pearson is over cape Naturaliste bearing S. by E. ½ E., as she will then be past Mussel rock, Black reef and the rocks that lie off the coast to the south-eastward.

TIDES.—It is high water, full and change, at Swan isles, at 9 h. 16 m.; springs rise 7 feet. The flood stream comes from the eastward, and the ebb from the westward; the flood and the ebb are each of 6½ hours duration at springs; but during neaps, the flood runs 7 hours and the ebb 5½ hours. The interval of slack water never exceeds a quarter of an hour, and the western stream begins 30 minutes after low water at springs, and 50 minutes after it at neaps; while the eastern begins 40 minutes after high water at springs, and 10 minutes before it at neaps.

The velocity of the stream, the strongest being the ebb, at springs, and with a strong westerly breeze, in the middle of Banks strait causes, when opposed to the wind, a high topping sea, dangerous for small craft. *See also* page 431.

RINGAROOMA BAY extends from cape Portland S.W. by W. ¼ W. 13 miles to Waterhouse point, and is 6½ miles deep. Between cape Portland and a point at 2½ miles to the southward of it, is a little bight affording anchorage for small craft: some small islets lie nearly one mile off the shore of the bight, the northernmost islet having a reef projecting a quarter of a mile to the northward. *See* page 431.

From the south-eastern point of this little bight, the beach which forms the south-eastern shore of Ringarooma bay, curves S.S.W. 6 miles to Ringarooma river, and from thence the southern shore curves westward 5¼ miles to Tomahawk river, close to the western entrance point of which is Tomahawk islet, connected with the point by a shoal. Between this islet and Waterhouse point the coast consists of a sandy bight and rocky points. There are 14 to 9 fathoms water at 1½ miles from the south-eastern shore, and 9 to 5 fathoms within a mile of the south-western shore of the bay.

Ringarooma river is used by small vessels occupied in the export of tin ore, quantities of which are found in the vicinity of mount Cameron, where the Ringarooma takes its rise. The mouth of the river is small, and at low water there is very little more than one foot on the bar, but as the rise of tide is 7 to 9 feet, there is generally sufficient water for the small vessels using the river; the principal danger is the surf, during strong northerly and westerly winds, at which time vessels do not venture.

Tomahawk river is not navigable, but small vessels are beached in fine weather at high water, and floated again at the next high tide. The bight about the mouth of Tomahawk river is shoal.

Both rivers have fresh water within 3 miles of their mouths, and there is a fresh water lagoon at 2 miles N.E. of Ringarooma river.

WATERHOUSE POINT,[*] 4½ miles W. by N. ¾ N. from Tomahawk point, is the rocky termination of a range of hills descending from Hardwick hill, 385 feet high; the point has a reef of rocks (pinnacles of which dry at low water) projecting a quarter of a mile to the northward. Between Tomahawk and Waterhouse points a bay is formed, in the depth of which rocks awash and sunken extend to a distance of half a mile from the shore; and at half a mile east of Waterhouse point there is a reef of rocks, some of which dry at low water.

The Coast from Waterhouse point trends south-westerly 1⅓ miles to a small point abreast Little Waterhouse island; this part of the coast has a sandy beach, with numerous dry and sunken rocks extending 3 cables from the shore. Off this point, in the direction of Little Waterhouse island, there is a rock dry at low water lying 3½ cables from the shore, and at 6 cables from the point there is a depth of 14 feet, between which and the shoal extending from Little Waterhouse island there is a navigable channel 2½ cables wide, having 4½ to 5 fathoms water.

WATERHOUSE ISLAND, the north point of which lies N.W. ¾ N. 3 miles from Waterhouse point, is 2½ miles long, N.N.E. and S.S.W., and half a mile broad.

Waterhouse island is 144 feet high, and the channel between it and Waterhouse point is 1¼ miles wide; it has an even summit, and has a gradual fall at its north extreme; in some parts there are a few trees, but the island is nearly cleared of timber. The owner of the island resides in a small wooden cottage near the sandy beach on the south-east side of the island.

Off this sandy beach a spit dry at low-water spring tides, extends in a north-easterly direction about 4 cables, the outer edge of the spit lies 2 cables from the shore, with shoal water one cable to the eastward of it. Along the eastern shore of the island north of the sand-spit a shoal flat extends to a distance of 4 cables until within half a mile of the north point, thence there are no dangers beyond one cable, along the north and west shores of the island.

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[*] *See* Admiralty plan of Waterhouse anchorage, on chart of Banks strait, No. 1,706; also on chart of Bass strait No. 1,695a.

Little Waterhouse Island, 38 feet high, lies nearly three-quarters of a mile south-east of the south point of Waterhouse island, and is about 200 yards in extent; rocks above and below water, extend nearly 2 cables from it in the direction of the south extreme of Waterhouse island, narrowing the principal passage to a width of 3 cables. A spit extends 2 cables in an easterly direction from the east point of the island, the tail of which has 16 feet water.

Dangers.—At a distance of about three-quarters of a mile W.S.W. from Little Waterhouse island lies a rock dry at low water; and S.W. by W. ¾ W. 1⅔ miles lies Barrett rock with 11 feet water. Between the rocks and Little Waterhouse island there are 9 to 10 fathoms water..

North-east of Little Waterhouse island, in the direction of the channel and occupying a central position, is a sand-bank with patches of rock upon it; the west end of this sand-bank is distant half a mile from Little Waterhouse island, and the east end 1½ miles. The shoalest part of this bank has 7 feet water, and lies N.E. ¼ N. one mile from Little Waterhouse island. Several sandy knolls of 14, 16, and 18 feet respectively, extend to the eastward, the outer of which lies 2 miles from Little Waterhouse island.

Anchorage.—Waterhouse anchorage, on the east side of Waterhouse island, may be recommended as a safe and useful anchorage, affording shelter from easterly or westerly gales. Vessels may anchor as convenient either in the channel near the west end in 5 fathoms, about 3 cables off the west end of the only sandy beach on the south side of the island, or just clear of the channel at the east end, over a sandy bottom, in about the same depth, near a patch of 3 fathoms, with Croppies point over the west end of Little Waterhouse island, bearing S.W. by S.

ANDERSON BAY.—From Croppies point, Anderson bay extends S.W. ¾ W., 12½ miles to East Double Sandy point; its south-western part forms a bight 6 miles deep, into which flow Trent and Forester rivers. The Great Forester and Trent, to the westward of it, have one mouth S.E. 5 miles from East Double Sandy point; and S.S.E. 2 miles from the point, is the mouth of West Forester. These rivers are separated from each other by Granite point. A rock lies 2¾ miles south-westward of Croppies point; nearly one mile off the mouth of the westernmost of the three rivers is Forester rock, both being above water.

Tides.—It is high water, full and change, at Waterhouse island at 10h. 16m.; springs rise 8 feet. The flood stream sets from the eastward and at the rate of about 2 knots at the anchorage.

CROPPIES POINT, S.W. ¾ W. 4 miles nearly from Waterhouse point, is free from off-lying dangers to the eastward as far as the point abreast Little Waterhouse island; the coast line is rocky, and the few sunken rocks which exist are not more than one cable from the shore.

South Croppies point lies S. by W. ¾ W. nearly one mile from Croppies point, with two small points and exposed sandy bays between.

At half a mile N.W. by W. ¾ W. from South Croppies point is the Croppie rock of 12 feet.

Working to the Westward in Banks strait.—In the summer months when westerly gales are of short duration it is advisable to stand towards the Tasmania coast, to take advantage of the shift of wind.

Winds.—During the survey of Banks strait, 1874–7, the heaviest and most frequent gales were experienced (blowing generally from the westward) in the months of September, October, and November.

On the termination of a westerly gale the wind in the vicinity of Banks strait sometimes shifts to the south-eastward; this was experienced at Swan isle and other anchorages, the barometer registering little more than 29·60. The wind seldom blows home with much strength, but sufficiently so (the swell rolling in simultaneously) to necessitate leaving the anchorage. All anchorages in Banks straits which are exposed to the south-eastward require great caution in their use, owing to the uncertain nature of the winds.

Mussel Roe bay is, taken altogether, recommended as the safest anchorage.

DOUBLE SANDY POINTS, which resemble each other, lie E. by N. and W. by S. 2½ miles apart, with a boat cove between them; they are topped with sand-hillocks almost bare, and the back country appeared sandy and more barren than that in the vicinity of Waterhouse point. At a mile from the eastern point there is no bottom at the depth of 13 fathoms; West Double Sandy point and another projection at 1¼ miles to the south-westward of it, have reefs extending from them; outside the former there are 4 and 5 fathoms within one mile of the shore; but at N.W. one mile from the latter is a reef of dry and covered rocks. Two sunken rocks, the positions of which are marked doubtful in the chart, lie to the northward of the Double Sandy points; one at the distance of a mile from the eastern, and the other at 2 miles from the western point.

Ninth Island is small, level, and of green appearance, lying N. by W. ½ W. 6½ miles from West Double Sandy point.

NOLAND BAY.—From the projection 1¼ miles south-westward of West Double Sandy point, Noland bay extends W. by S. ¾ S. 10 miles to Stony head, and is 3 miles deep. Little and Great Piper rivers flow into the bay, the former at 5 miles south-westward of West Double Sandy point, and the latter at 2½ miles farther to the south-westward; the shore between the two rivers is rocky. At 2 and 3 miles eastward of Stony head are two rocky points with a sandy bay between them, and Tam O'Shanter bay on the west side of the western point, between which and the head the shore is rocky.

STONY HEAD, a conspicuous, but not very prominent projection of the coast, is the extremity of a ridge of hills branching out from the inland mountains, and stretching across the low sandy land in front, to the sea.

From a rocky point one mile W.S.W. of Stony head, the coast trends S.W. by S. 3 miles to Currie river, and thence W. by N. 3½ miles to Five Mile bluff, forming a bay 1½ miles deep, mostly bordered by reefs.

Tenth Island, N.W. 3 miles from Stony head, is a mere white rock much resembling Ninth island from a distance, both being rather low, with cliffy faces to the westward, and sloping away in the opposite direction.

There is a safe channel between Tenth island and Stony head, with apparently no other dangers than a reef which surrounds the island.

DIRECTIONS.—Tenth and Ninth islands are good guides for Waterhouse anchorage; the course and distance from the former are N.E. ¾ E. 14 miles to the latter island, which should be passed on the north side, and from Ninth island E. by N. 15½ miles to the south point of Waterhouse island. Mount Cameron bearing nearly S.E. by E. ½ E., is a distant mark for making Waterhouse island from the north-westward.

LOW HEAD.— From Five Mile bluff the coast trends S.W. ½ S. 4½ miles to a bight formed on the south-west side by a narrow promontory extending N.W. by W. one mile to Low head, the eastern entrance point of port Dalrymple and Tamar river. A reef lies N.E. ¼ E. 1¾ miles from Low head, and three quarters of a mile from the shore, with which the reef is connected by a shoal. Vessels are liable to be set by the ebb stream into the bay between the reef and the head.

LIGHTS.—The lighthouse on Low head, which stands 2 cables within its extremity, is a tower 36 feet high, its upper part being red and the lower part white; it exhibits at an elevation of 142 feet above high water, a light *revolving every minute*, visible from a distance of 15 miles; at a distance of 10 miles it appears for *fifty seconds bright*, and *fifty seconds dark.*

Leading Lights.—Two leading lights are exhibited from two towers 30 feet high, on She-oak point, port Dalrymple, east side of Tamar river entrance. The lights are *fixed* white lights, placed 400 yards apart, and when kept in line bearing S.E. by E. ½ E. lead through the West channel Tamar river entrance. The lights should be visible in clear weather from a distance of 9 miles. The upper light, elevated 55 feet above high water, is visible between the bearings of N.N.W., through north and east, to S.E. ½ E. The lower light, elevated 38 feet above high water, is visible between the bearings of N. ½ W., through north and east, and S.E. ¼ E.

PORT DALRYMPLE and TAMAR RIVER.—Port Dalrymple, the principal harbour on the north coast of Tasmania, constitutes the entrance of Tamar river, which river is formed by the confluence of the North and South Esk rivers at Launceston, and flows through a valley betwixt two irregular chains of hills, that shoot out north-westward from the great body of inland mountains. In some places these hills stand wide apart, and the river then widens to a considerable extent; in others, they nearly meet, and contract it to narrow limits. Of the two chains of hills which bound the valley, the eastern one terminates at Low head; the other descends to Badger point, S.W. by W. ¼ W., 6½ miles from the head.*

The ends of these chains, when seen from directly off the entrance, appear as two clusters of hills having some resemblance to each other; and in fine weather, the distant blue heads of the back mountains will be seen over the tops of both clusters. These appearances, together with the position of the vessel, are the best distant marks for finding port Dalrymple.

Coming alongshore from the eastward, Ninth island, and afterwards Stony head with Tenth island lying off it, will show the vicinity of the port; and Low head, with the conspicuous lighthouse on it, will be perceived in the bight to the S.S.W. At 10 or 12 miles to the south-westward of the port, the back land is uncommonly high, and the top of the ridge is rugged, forming uncouth shapes. These mountains, with the direction of the coast and the most remarkable of the clusters of hills just noticed, may serve as marks for port Dalrymple, to vessels coming alongshore from the westward.

The entrance of port Dalrymple, between Low head and Friend point, which lies S. by W. ¾ W. 1⅔ miles from the head, is difficult of access, on account of the numerous reefs and banks in it, which extend a considerable distance from the western side of the entrance; strangers should therefore avoid that side, and endeavour to enter by Low head. The greater part of these shoals, and also of those within, are covered at half tide, so that with the flood, or even a little before, is the best time to enter port Dalrymple, as almost the whole of the dangers are then visible.

HEBE REEF, the outermost danger off the entrance of port Dalrymple was so named from a ship which was lost on it in 1808; the reef is about a quarter of a mile in extent, mostly in an East and West direction. A small portion of its centre, which is nearly dry at low water, lies West 2½ miles from Low head lighthouse. A bank with 4 to 4½ fathoms water on it, extends half a mile eastward from the reef; but there are 6 and 7 fathoms at less than a quarter of a mile northward and southward of the reef. As the northern edge of Hebe reef is in line with Flinders and Badger points, bearing S.W. a vessel by keeping Badger point open to seaward of Flinders point, will be outside it.

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* *See* Admiralty plan of port Dalrymple on chart, No. 1,694; scale, $m = 2$ inches; and river Tamar, No. 1,080; scale, $m = 1$ inch.

Buoy.—A nun buoy painted with vertical red and white stripes, with the letter H in black on it, is moored in 8 fathoms water at one cable N.W. ¾ N. from the reef, with Low head lighthouse bearing E. ¾ S.

The Eastern Shore of port Dalrymple, from Low head, trends 1¾ miles in a S.E. ¼ S. direction to She-oak point the south point of port Dalrymple, and consists of alternate points and small bights, bordered by a shoal, the 3-fathoms edge of which projects one to 2 cables from the low water line; the shoal extends as a spit, 1½ cables north-westward from Low head, at a quarter of a mile southward of the lighthouse it projects 1⅔ cables south-westward, nearly to the Middle bank.

Barrel Rock Beacon, which is red and white, stands on a projection of the reef which borders the shore, at S. by E. ½ E. two-thirds of a mile from Low head lighthouse; a spit projects one cable from the beacon in a S.S.E. direction, towards a 2¼ fathoms patch of kelp, known as the 3-fathoms bank, which extends 2½ cables from the beacon.

Anchorage.—There are 3½ to 4 fathoms water between the 3-fathoms bank and the shore, and anchorage in 4 to 8 fathoms in port Dalrymple, or anywhere between the 3-fathoms bank and She-oak point, with 3 fathoms water from 2 to 2½ cables from the shore.

The Towers, are two circular black stone beacons, built on the southern end of lagoon beach, bearing nearly S.E. by E. ½ E. distant about three-quarters of a mile from Barrel rock beacon; they bear W.N.W and E.S.E. distant about 340 yards from each other, and being 80 feet high, are visible 7 miles. These towers were erected to guide strangers into the port, when the weather was too bad for the pilots to venture outside.

Middle Bank, the most dangerous shoal in the entrance of port Dalrymple, is a rocky patch, between the bearings of W. by S. ½ S. 5 cables, and S.W. ¼ S. 6 cables from Low head lighthouse, with only 12 feet in some parts at low-water springs. The northern extremity of Low head in line with the first black cliffy projection to the eastward of it, or the flag-staff on Low head open to the northward of the lighthouse, clears the northern edge of it, and its south-west edge is marked by a black buoy, bearing S.W. by W. ¼ W., distant 6 cables from the lighthouse.

East Channel, lying between Middle bank and the shoal which borders the west side of Low head, is one-third of a mile wide in the outer part, with 4 to 6 fathoms water; but the inner part is barely a quarter of that width, with 3¼ fathoms apparently on a ridge, extending from the south-east extreme of the Middle bank to the shore. Browne's house open west of Shear beacon S. ¾ E. leads through. This channel is not safe for a stranger to enter without a pilot.

WEST CHANNEL, the main entrance into port Dalrymple, is formed by the Middle bank on the north-eastern, and Yellow reef on the south-western side, and is nearly 2 cables wide, with depths of 22 to 10 fathoms.

Yellow and West Reefs.—Yellow reef is an extensive patch of kelp, with a double light-coloured rock, on which the least depth of water is 6 feet; it is marked by a white buoy, bearing S.W. ¾ W., distant three-quarters of a mile from the lighthouse. This rock forms the east extreme of West reef, the northern edge of which extends from the white buoy nearly three-quarters of a mile in a West direction. This reef is about one-third of a mile broad, but the only part of it uncovered at high water is Black reef, which dries 2 feet near the centre, bearing S.W. ½ W., distant nearly 1¼ miles from the lighthouse.

Shear Beacon, S.W. by W. ½ W., 4½ cables from Barrel rock beacon, stands on the uncovered part of Shear reef connected with West reef by shoal water, where the greatest depth does not exceed 15 feet; a spit, with 1½ fathoms on its extremity, projects N. by E. nearly 2 cables from Shear beacon. Shear rock which dries 2 feet lies between the beacon and the spit. A white buoy lies to the northward of the rock.

The South-west Shore of port Dalrymple, from Friend point, the south-west entrance point of the port, trends S.E by E. about three-quarters of a mile to Browne's house, the first within Friend point. From Browne's house the shore extends nearly S.E., 1½ miles to the north-west point of Kelsal bay.

This shore is fronted by a bank, which extends about one mile northward and north-eastward to West and Shear reefs, with a narrow inlet—about midway between Friend point and the outer edge of the reefs—running into the bank from the westward, and carrying 1¾ to 1¼ fathoms water. Between this inlet and the shore there are numerous patches of reef, dry at low water.

From the spit, which projects northward from Shear beacon, the 3-fathoms edge of the bank extends S.E. ½ S. 1¼ miles, and thence S. by E. ½ E. nearly 1½ miles to the west point of Kelsal bay. There are several knolls on the bank, those nearest the edge being marked by white buoys, the northern buoy bearing S.E., distant three-quarters of a mile from Shear beacon. There is good anchorage in 4 or 5 fathoms at about 2 cables above the northern buoy. Between the southern white buoy and Kelsal bay Honduras bank with 15 feet water on its outer edge, extends about half a mile off from the low-water line.

The Eastern Shore of port Dalrymple from Shea-oak point takes a general S.S.E. ½ E. direction, 2 miles to the south-west point of Georgetown; the shore curves a little to the eastward, and about midway between the two points is Long Tom point, which is fringed with reefs, projecting nearly 2 cables from the shore. At a quarter of a mile northward of Long Tom point stands Cox house near the shore.

The eastern shore of port Dalrymple is fronted by a flat, the 3-fathoms edge of which, from 2 cables off Shea-oak point, trends irregularly S.S.E. half a mile to Simmons mistake beacon, from which a spit, with 3 feet water on it, extends nearly a quarter of a mile to the north-eastward. From Simmons beacon, the edge of the east flat, which is slightly curved and steep-to, trends S. by E. ¾ E. rather more than a mile to the west point of the east flat, which is marked by a beacon, and thence E.S.E. for half a mile, with an intermediate beacon, to the south-west point of Georgetown. There are several 'patches of reef on the flat between the beacon and the town.

Bombay Rock, N.W. 2 cables from the west beacon just noticed, is a sunken danger, marked by a red buoy; there is a narrow 7-fathoms channel on the east side, but the main channel is on the west side.

GEORGETOWN is situated on the eastern shore, at nearly 3½ miles within Low head; it is built upon a flat, forming the north-western side of Georgetown or York cove, at the western foot of a group of conical hills. Mining is carried on in the neighbourhood. There is steam communication with Launceston and Melbourne. It is also a telegraph station. Population of town and district in 1881 was 4,417.

Georgetown Cove extends about N.E. by E., 4 cables along the south-eastern side of the town, and is 1¼ cables wide, with 10 to 2 fathoms water.

Middle Shoal, which lies in the entrance of the cove, is a cluster of rocks one cable long, and has a beacon on its south-west end, bearing S.E., distant 1½ cables from the south-west point of Georgetown. There are 9 fathoms water between the shoal and the town, and 16 fathoms between the shoal and the south-east entrance point of the cove.

Kelsal Bay and Arthur Head.—Kelsal bay extends from its north-west point S.E. ¼ E. three-quarters of a mile to Arthur head, and is one-third of a mile deep; the bay, except a small inlet close to its north-west point, is filled by a shoal flat, which extends about half way across towards Georgetown. The north extreme of this flat forms a spit, with 3 feet water on it, marked by a white buoy, lying West three-quarters of a mile from the south-west point of Georgetown.

Garden Isle.—From the northern spit of the flat its north-eastern edge trends E.S.E. two-thirds of a mile to the north point of Garden isle, which is 2 cables long, N.E. and S.W., with a small hillock on its north-east end, close off which there are 18 fathoms water. There is a narrow reef on the edge of the flat between 1½ and 3 cables north-westward of the island, marked by two beacons. Between Arthur head and Garden isle there are 7 fathoms water.

Port Dalrymple channel from the Middle bank to Georgetown is half a mile to one cable wide between the flats which front the shores; the narrowest part being abreast of Simmons mistake beacon. There is a sufficient depth of water for ships of the heaviest draught, in the fairway, where the soundings range from 29 to 5 fathoms, without any other known hidden danger than the Bombay rock.

Beacons and Buoys.—The shoals on either side within the entrance of Tamar river are marked with beacons and buoys: the beacons on the western shore are marked thus ◁, and those on the eastern side, as a cross †. Shoals or rocks, marked with chequered buoys, may be passed on either side: a red or black buoy signifies that the danger extends from the eastern shore, and a white one that it extends from the western shore.

PILOTS.—By making the proper signal, strangers may always procure pilots off port Dalrymple, when the weather will admit of their going off; and should the weather be too bad for this purpose, the boat will be lying in mid-channel with the flag flying.

DIRECTIONS.—For the guidance of those who are obliged to run in without a pilot, the following directions and a good look-out may prove sufficient; especially since the two leading lights have been established on She-oak point, by keeping which in line bearing S.E. by E. ½ E. *see* page 437, strangers may run in through the west channel with safety, if, on arriving off the port, it should blow too hard for a pilot to get outside. As a rule, strangers should never attempt East channel without a pilot.

West Channel.—A vessel bound for port Dalrymple or Tamar river is recommended to use West channel, being the safer. When coming from the northward or eastward, keep the lead going, and having Low head light bearing South, it may be approached to 3 miles, when a south-west course can be steered until the leading lights are sighted on a south-east bearing, then steer South and bring them in line bearing S.E. by E. ½ E. which is the mark for steering in, *see* page 437, passing close to the buoys on Yellow and Shear rocks, also to the point of the reef near Barrel rock.

Before the leading lights are brought in line, care must be taken not to bring Low head light to the eastward of E. by S. The same precaution is necessary when coming from the westward.

When Shear rock is passed bring the leading lights about 1½ points on the port bow, taking care not to open the low light to the southward of the high, to avoid the bank westward of Cardell point, and having the hand lead quickly going, steer by the white buoys on the starboard hand, and Simmons mistake beacon on the port, whence the course to the Bombay rock is S. by E. So long as the low leading light is in sight, the vessel is clear of this last danger, which is marked by a red buoy. Beyond Bombay rock the low light passes out of sight, and the course is S.E. Garden island can be closely rounded. The high leading light must always be kept in sight, or the vessel would come too close to Garrow rock near Georgetown.

Great attention must also be paid to the tide streams, as they set obliquely across this part of the river; the ebb, for instance, crosses from Kelsal bay to the beacon on the west point of the east flats, and with such strength as to form whirlpools.

Anchorages.—The anchorage in port Dalrymple is about one cable within the line of lights (the high light to eastward open of the low) in 8 fathoms water.

Georgetown Cove.—Having entered the cove, anchor opposite the wharf, in 5 fathoms, and moor either with half a cable each way, or with a kedge on the shore, or perhaps, with a hawser to the trees.

For Kelsal Bay.—If intending to anchor in Kelsal bay, pass on the west side of Bombay rock, and keep near the western shore, in order to avoid the northern spit of Kelsal bay flat, marked by a white buoy. After, entering the bay a vessel may moor to the trees.

East Channel.—Vessels entering port Dalrymple by East channel, which it is not advisable for a stranger to do—and should never be attempted at night—are recommended to close the west side of Low head, to avoid the shoals which stretch out at least two-thirds of the way across from the south-western shore of the entrance.

Shear beacon being clearly distinguished, bring Browne's house open west of the beacon, bearing S. ¾ E., which will lead through East channel. Continue this course until the two leading lights on She-oak point are in line, when steer towards them for the anchorage in port Dalrymple abreast of Lagoon beach. Or, if bound for Georgetown, proceed as directed when entering by West channel.

Bound Seaward, Garden island should be closely rounded, thence, without losing sight of the high leading light, a N.W. course can be steered, and when the low leading light comes in sight bearing N. ½ W. it may be steered for, keeping a sharp look out for the buoy near Bombay rock and for Simmons mistake beacon, having passed this last Low head light may be steered for, and, as soon as the two leading lights are in line keep them so until the vessel is outside. When neither the black buoy near Middle bank, nor the white buoy near Yellow bank are in sight, if Low head light bears E. by N. ½ N. the vessel is outside the entrance of West channel.

The eastern shore of Tamar river, between the south-east entrance point of Georgetown cove, and Roundabout point, which lies S. by W. two-thirds of a mile from it, forms an irregular sandy bay, between which and Garden isle the river is one-third of a mile wide, with 9 to 25 fathoms water, affording room for many vessels to anchor; but the bottom is uneven, and the streams are rapid and irregular.*

Porpoise Rock, which lies one cable off Roundabout point, has 4 feet on it at low water; it has a black buoy, and the water is deep close round it.

Deceitful Cove.—From Roundabout point the shore trends nearly S.E. three-quarters of a mile to the foot of a hillock, between which, and Effingham point, 3 cables to the southward of it, is the entrance of Deceitful cove, a shoal creek trending to the northward.

The western shore from Arthur head curves nearly S.S.E. half-a-mile to the north-west extreme of Bryan bay, thence it extends S.E. by S. nearly one mile to Anchor point, and is a quarter of a mile deep, with 4 and 5 fathoms close to the shore. There are 26 to 7 fathoms between Roundabout and Anchor points, with anchorage in 4 to 8 fathoms, in Bryan bay, at a quarter of a mile from the shore.

Shag Rock, lying E.S.E. nearly 2 cables from Anchor point, is just covered at high water; there is deep water close round the rock, and 19 fathoms between it and the shore: this rock is marked by a beacon.

West Arm.—Ilfracombe.—Yorktown.—The entrance of West arm extends from Anchor point S. by E. ¾ E. three-quarters of a mile to Inspection head, at Ilfracombe, whence the arm trends westward and south-westward 2½ miles to the ruins of Yorktown; West arm is a shoal inlet one-third of a mile wide half way in, above which it expands to two-thirds of a mile in width, and has a small fresh water stream flowing into its western corner.

Middle Arm is about three-quarters of a mile wide, N.W. and S.E., between Inspection and Middle heads, whence it trends 2½ miles to the southward. There are 10 to 13 fathoms in the entrance, and 3 fathoms at about three-quarters of a mile within it; above which the arm is mostly filled by a shoal flat, branching to the southward and south-eastward.

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* *See* Admiralty plan, Tamar river, No. 1,080; scale, m = 1 inch.

Middle Isle.—Between Middle head, and a projecting point N.E. ¾ E. 2 miles from it, the southern shore of the river forms a bay three-quarters of a mile deep; but it is filled by a shoal flat, the edge of which from Middle head, extends N. by W. two-thirds of a mile to a spit, whence it curves round eastward and northward to Middle isle, which lies W. by N. half a mile from the north-east point of the bay. There is good anchorage in 5 to 7 fathoms one-third of a mile to the westward of Middle isle, with soft regular bottom, and out of the strength of the stream, where a vessel not having a pilot, is recommended to anchor before proceeding farther up the river.

The Quarantine Ground is the bight formed in the northern edge of the shoal flat, just noticed, from its north-west spit to Middle isle, between which there are 7 fathoms, with 4 fathoms close to the edge of the flat.

From Effingham point the northern shore extends E. ½ N. 1½ miles to 3 cables northward of Middle isle; there are 6 fathoms close to this shore, and 19 to 4½ fathoms in the fairway between it and the Quarantine ground.

Long Reach.—From the north-east point of the shoal bay, fronted by the Quarantine ground, the south-western shore of Long reach trends E. by S. 1½ miles and S.E. by E. 1½ miles to Rapid point. A shoal bank about one cable broad, extends from Middle isle along this shore to Rapid point, a projection of the bank being marked by a beacon, E. by N. 3 cables from the north point of the island; a rocky spit extends 2 cables from the shore, half a mile north-westward of Rapid point.

From one-third of a mile N.N.W. of Middle isle the north-eastern shore —where there is copper and iron ore—curves N.E. and E.S.E. 2 miles to a fresh-water stream, close off which there is anchorage in 4 fathoms. Thence the shore extends S.E. ½ E. 2 miles to the entrance of East arm; it is intersected by small creeks, and rises to a range of stony, but well-timbered hills. The depths of water in Long reach are irregular, varying from 9 to 4 and from 15 to 9 fathoms in the fairway; the deepest water being on the north-east side of the reach, as a bank, with 2½ to 3 fathoms on it, extends 3 cables from the south-west shore for a distance of 2 miles from Middle isle.

East Arm is 4 cables wide at its entrance, whence it runs in East half a mile, and S.E. one mile, its eastern corner terminating in Fourteen Mile creek. From 9 fathoms in the entrance, the depths decrease to 1½ fathoms about one mile within it. There is ironstone along the south-western shore of East arm.

Moriareg Reach.—From Rapid point the western shore of Moriareg reach trends S.W. by S. one mile to Shark bay, and thence sweeps round in a S.S.W. direction 1¼ miles to Devil's Elbow point, close off which is an islet, with sunken rocks along its south-east side. This shore which is indented by several shoal bights, may be generally approached within a cable in 6 to 8 fathoms. There is anchorage in 6 or 7 fathoms, close off Shark bay; and in 8 fathoms, off a similar bight at one-third of a mile north-eastward of Devil's Elbow.

Sidmouth.—Between Devil's Elbow, and a projecting part of Sidmouth, S. by W. one-third of a mile from it, is a bay having 3 to 5 fathoms water, in which there appears to be anchorage, out of the stream.

The eastern shore of Moriareg reach from East arm, trends S.W. one mile to a projecting point, thence South half a mile to another point, between which and a projection S. by W. ½ W. three-quarters of a mile from it, is a bay half a mile deep, with a creek in its bight; the bay is bordered by a flat which extends a quarter of a mile from the shore. At the entrance of this bay is a 2-fathoms bank, one-third of a mile long, N.N.E. and S.S.W., with a beacon on its south-west point. There is a small 2-fathoms patch in the southern part of the bay, at a quarter of a mile to the eastward of the beacon, with 4 fathoms close to the eastward and westward of it, and 5 to 7 fathoms to the northward of the patch, where there is anchorage with soft bottom. The channel between the bank and the western shore is one cable wide, with 2 to 4 fathoms water in it.

Redwood Islet lies 3 cables to the south-westward of the south-west point of the bay, just described, from which point the shore trends S.S.W. half a mile to the east point of the north-western entrance of Whirlpool reach; the channel between Redwood islet and the islet off Devil's Elbow is one cable wide; with 12 fathoms water in it.

Whirlpool Reach.—Whirlpool reach, from its north-west entrance, between Sidmouth and the opposite point, trends S.E. by E. nearly one mile, and is barely 2 cables wide, with irregular depths of 20 to 7 fathoms.

From a creek on the south-west side of the south-eastern entrance of Whirlpool reach, the south-western shore trends nearly S.E. by E. 1¼ miles, and then S.E. by S. 1⅓ miles to Supply rivulet; about half a mile E.S.E. of the creek, and at the same distance N.N.W. of the rivulet, some sunken rocks lie about a cable from the shore.

Dangerous Rock. — Just within the north-west entrance of Whirlpool reach is a dangerous rock; in attempting to remove which by blasting, only the top was blown off; so that vessels are now liable to be carried upon it, whereas, when it previously broke the surface, such was not the case. This danger has 10 fathoms water on its south-west side but only 3 fathoms on its north-east side.

Spring Bay is a bight 1½ miles deep, situated between the north-eastern point of the south-east entrance of Whirlpool reach and another point E. by S. ½ S. 1⅔ miles from it. At half a mile within the entrance, where the bight is reduced to two-thirds of a mile in width, is a narrow bank half a mile long, E. by S. ½ S. and W. by N. ½ N., with 6 to 9 feet water on it, and marked by a beacon. There is a channel barely one cable wide, between each end of the bank and the shore, that to the westward having 7, and the other 5 fathoms; both of these channels lead into a basin, with 10 to 8 fathoms water in it, between the bank and a shoal flat extending half a mile from the head of the bight. There is anchorage in 5 to 8 fathoms, sand and shells, between the south-east entrance of Whirlpool reach and the bank to the eastward of it.

Exeter.—Swan Point.—From 2 cables south-eastward of Supply rivulet, the river frontage of Exeter trends N.E. ½ N. one mile to the west point of a shallow bight, which extends E. ½ S. 4 cables to Swan point, a narrow projection with a spit stretching out a quarter of a mile to the north-eastward.

Supply Flats.—From the shore between Supply rivulet and Swan spit, Supply flats extend above one mile in a N.W. direction; the outer part, for a distance of half a mile, forming a spit 3 to 2 cables broad, with 12 to 9 feet water on it, and a beacon at 300 yards within its outer extreme. There is a channel 3 to 2 cables wide between the flats and the south-west shore, carrying 8 to 3 fathoms water, to within 4 cables of the entrance of Supply rivulet. There are 16 to 10 fathoms between Spring bay and the spit of Supply flats.

The fairway between the spit of Supply flats and the point to the northward of it is a quarter of a mile wide, with 9 fathoms water; thence to abreast of Swan point the channel is about one-third of a mile wide, with 5 to 7 and 14 fathoms water, and in which there is anchorage about N.N.W. 4 cables from Swan point.

Dorchester.—Between the south-eastern point of Spring bay and another point E. by S. 1¼ miles from it, three shallow indentations of the northern shore form the river frontage of Dorchester.

Egg islet lies N.W. by N. three-quarters of a mile from Swan point and one cable from the most prominent point of Dorchester, is 300 yards long, N.E. and S.W., and has a spit extending 4 cables to the westward, where it is marked by a beacon. This islet and spit are separated from the shoal which borders the shore by a channel one cable wide, having 9 to 15 feet water.

From the point one-third of a mile eastward of Egg islet the north-eastern shore curves 1½ miles, in a S.E. by E. ¾ E. direction, to a fresh-water inlet, and thence S.E. three-quarters of a mile to a small stream, the south-point of the mouth of which has a ledge of sunken rocks projecting a quarter of a mile from it. From this point a bay extends S. by W ½ W. one mile, and is half a mile deep, with a stream flowing into its bight; but it appears to be inaccessible on account of the shoal flat which fills the bay. From the southern extreme of this bay the Crescent shore extends S.W by S. nearly 1¼ miles to its western point, and is bordered by a shoal one to 2 cables broad.

The western shore from Swan point to a projection at S.S.E. one mile from it, forms a bay one-third of a mile deep; but it is filled by a shoal flat. From the south-eastern point of this bay the shore trends nearly S. by E. 1¼ miles, and then sweeps round three-quarters of a mile in a S.S.W. direction, to a small bight, 300 yards southward of which is Stony creek.

The shore from Swan point to Stony creek is fronted by shoals, the northern portion of which, for about three-quarters of a mile south-eastward of Swan point, extends nearly one mile from the land; but the outer edge from thence gradually closes southward to one cable off Stony creek. There are generally 3 to 12 feet water on these shoals; but the northern extreme consists of a bank, the edges of which are marked by four beacons, standing respectively E. ¼ S. half a mile; E. ¾ S. two-thirds of a mile; S.E. by E. ½ E. three-quarters of a mile; and S.E. half a mile, from Swan point. There is a small inlet between the north-west extreme of this bank and Swan point. The shore is also bordered by an inner bank about 1½ to 3 cables broad, on the outer edge of which are two beacons; one at S.E. by S. one mile, and the other S.S.E. ¾ E. 1½ miles from Swan point.

Swan Bay.—From Egg islet the channel trends S.E. by E. ½ E. 1½ miles, and is one-third of a mile wide, with 14 to 4 fathoms, between the north-eastern shore and the shoals which extend from Swan point. The river then increases to one mile in width, forming Swan bay, which has 4 to 8 fathoms water, and affords convenient anchorage. After retaining nearly this width for one mile to the southward, the river gradually contracts to one-third of a mile abreast of Stony creek, where there are irregular depths of 16 to 5 fathoms.

Mount Macquarie.—Upway.—Signal Station.—Mount Macquarie, N.E. by E. ½ E. nearly 3 miles from Swan point, rises from Upway to the height of 1,212 feet, and has a signal station on its summit.

From Stony creek Tamar river sweeps round E.S.E. and eastward 2¾ miles to Cimitere point, and is generally about one-third of a mile across, from shore to shore; the channel being one-quarter of a mile wide, with 12 to 7 fathoms water in the fairway.

From Cimitere point the south-westward shore trends S.E. 2½ miles to the western side of the entrance of Muddy creek, which extends from thence N.E. by E. nearly half a mile, and is half a mile deep; but it is filled by a shoal flat. The shore from Muddy creek trends N.E. by E. about three-quarters of a mile, to 3 cables south-eastward of Pedder point. Between Cimitere point and Muddy creek the shore is bordered by a shoal one to 2 cables broad, and the range of Stony and Pleasant hills extends from Stony creek along shore to Muddy creek.

Nelson Shoals.—The shore from a quarter of a mile northward of Cimitere point trends E. by N. 2 miles to a small stream flowing from the eastward, and thence the shore trends S.S.E. ½ E. 1½ miles to Pedder point. The bight thus formed is filled by Nelson shoals, which extend so far towards the opposite shore as to contract the river channel to the width of 3 or 4 cables, with 4 to 2 fathoms water. From about 1½ miles south-eastward of Cimitere point the channel round to Pedder point is only one to 2 cables wide; but the depth of water ranges from 2½ to 6 fathoms. The edge of Nelson shoal is marked by beacons.

From Pedder point the river takes a semicircular course round by N.E., 2½ miles to Barnard, or Muddy Plains creek, on the eastern side of the river, E.S.E. 1½ miles from Pedder point. The south-eastern shore of this part of the river is bordered by a shoal one to 1½ cables broad; but the north-eastern, or Crescent shore is steep-to. The channel from Pedder point to Barnard creek is one to 2 cables wide, with 2 to 9 fathoms water; but from the north point of the mouth of the creek a 9-feet spit projects 2 cables, leaving a channel only one cable wide, with 2½ fathoms water, between it and the western shore. On either side of this part of the river there are hills of no great elevation, between which the land appears low and swampy.

From Barnard creek the river trends S.S.E. three-quarters of a mile, with a width of one-third of a mile, and depths of 2½ to 4 fathoms, hence the river expands to three-quarters of a mile in width for about 1¼ miles in a S.E by S. direction, when it trends E.S.E. 1½ miles; its width gradually decreasing from three-quarters of a mile, midway, to 300 yards abreast of the south-eastern of two small jetties, 4 cables apart, projecting from the north-eastern shore.

From a low point one mile S.S.E. of Barnard creek the north-eastern shore of Tamar river curves S.E. ½ S. 1½ miles to a point projecting 2 cables from Green hillock. From this point the shore trends nearly S.E. by E. ½ E. a little more than a mile to the south-eastern of the two jetties, just noticed. The south-western shore is low, and from about 1⅓ miles S. by E. of Barnard creek, curves uniformly 2½ miles in a S.S.E and easterly direction to abreast of the south-eastern jetty. This broad part of the river, from about one mile southward of Barnard creek to the south-eastern jetty, is mostly filled with shoal flats, through which the river is reduced to a very narrow winding channel, with so little as 6 feet water in it, passing between Green hillock; and Pig islet, W.N.W. half a mile from it. This islet, which is about 300 yards in extent, is the north-easternmost of two or three small wooded islands lying westward of Green hillock.

The river channel from nearly one mile southward of Barnard creek trends S.E. by E. three-quarters of a mile towards Green hillock, and is a quarter of a mile wide, with 9 feet to 3 fathoms water. At half a mile northward of Pig islet this part of the channel is nearly blocked up by a rocky patch, which is marked by a beacon; the sides of the channel one cable to the north-eastward and south-westward of the rocky patch being also beaconed. From a quarter of a mile north-eastward of Pig islet the channel trends southward between the islet and Green hillock, about one mile, or to within a quarter of a mile of the south-western shore, when the channel sweeps round eastward, and then turns south-eastward close to the two jetties. From a quarter of a mile north-eastward of Pig islet to about the same distance southward of the south-eastern jetty the channel varies from 100 to 200 yards in width, with irregular depths of 3 to 1¼ and 4 fathoms, and 6 to 9 feet near the jetties. The numerous buoys and beacons which mark the channel will be best understood by reference to the plan.

From a quarter of a mile South of the south-eastern jetty the river trends S.E. ½ E. three-quarters of a mile, S.W. by S. two-thirds of a mile, and S.E. one mile to the junction ef the North and South Esk rivers, at Launceston. The channel varies from one to 3 cables in width, with 3 fathoms to 6 feet water.

A range of woody hills extends from Muddy creek nearly 6 miles to Launceston. Between these hills and the river the land is low, and to the northward swampy ; but between Green hillock and a lagoon at one mile northward of Launceston, the north-eastern shore is hilly.

DIRECTIONS.—If bound up Tamar river from Georgetown, haul close round Garden islet, to avoid Middle shoal, and having run between Porpoise rock and the western shore, proceed S.E. ¾ S., so as to pass midway between Anchor and Effingham points ; and after clearing Shag rock—if not required to anchor in the Quarantine ground—steer for the north point of Middle isle, thence north-eastward into Long reach ; and having fully opened its south-eastern trend, steer through it, keeping nearer the north-eastern shore than otherwise, to avoid the shoals and spit which project from the south-western shore. But no prudent stranger would venture to proceed beyond Middle isle without a pilot. The greatest difficulty in navigating the river between Georgetown and Launceston is Whirlpool reach.*

LAUNCESTON, the second town in Tasmania, is situated at the head of Tamar river, which, following the winding course of the river is 35 miles from the sea. Large vessels are prevented from approaching close to the town by a bar, upon which there are generally about 14 feet at high water. Vessels of 17 or 18 feet draught can go within half a mile of the town, below the bar. It is connected with Hobart by a railway. Steam vessels run to Melbourne twice a week; to the north-west and north-east coast weekly; and to Sydney fortnightly. The population in 1881 was 12,752 persons.

A Steam Tug, maintained by the Marine Board, is available for towing vessels, at moderate rates; the signal for the tug is the rendezvous or chequered flag, hoisted where best seen. When this signal is made by a vessel in the offing, entering the port, the tug, if at Launceston, will be telegraphed for on that vessel's account.

Floating Dock.—There is a floating dock at Launceston, capable of receiving vessels of 500 tons. In Georgetown cove and other places on the banks of the river, vessels of considerable size may be safely placed upon the "*hard*" to be cleaned or examined.

Electric Telegraph.—There is an electric telegraph from the heads to Launceston, and from thence to Hobart and the interior.

Pilotage for sailing vessels at the port of Launceston, is 1*s*. per ton inward or outward; for steam vessels 8*d*. per ton each way; no single act of pilotage to exceed 30*l*. or be less than 5*l*. Vessels anchoring below Georgetown, charged one-third pilotage; at or above Georgetown, and below Whirlpool reach one-half pilotage. Vessels arriving and sailing in ballast or putting in to seek freight, or from stress of weather, and not breaking bulk, are exempt from all port charges, except only those of pilotage in cases where the services of a pilot have been actually required and received.

When the weather will not permit the pilots to proceed outside, the boat will be lying in mid-channel with a flag flying.

TIDES.—It is high water, full and change, at the Pilot station at 11 h. 10 m.; springs rise 10 feet; at Georgetown, at 0 h. 5 m.; springs rise 10 feet; and neaps 4 feet. Captain Stokes found the rise irregular, the greatest being 10 and the least 4 feet. The highest tide noticed was during the neaps, caused by a strong north-west gale. The flood runs 5 h. 50 m., and the ebb 6 h. 25 m. with a velocity varying from 2 to 5 knots, according as the river is confined or open. The ebb stream setting round Low head into the bay to the eastward is apt to drift vessels in that direction. At 3 miles in the offing the flood stream runs W.N.W., one to 2 knots.

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* Sailing Directions for Tamar river, by Mr. John Welsh.

At Launceston it is high water, full and change, at 1 h. 0 m.; springs rise 12½ feet. During winter, after rains, the stream sets down for days together, at the rate of one to 3 knots.

THE NORTH COAST of Tasmania from Flinders point curves nearly W. ¾ S. 34 miles to Round hill point, and has 10 to 15 fathoms water within 2 miles from the shore. There are not many projecting points; but this coast is intersected by no fewer than six rivers and one creek, all of which, except the creek, are accessible to vessels of 80 to 200 tons. These rivers flow through a hilly country, which is tolerably wooded to the back mountains. Upon this elevated range are many variously shaped summits; among which are mount Roland, 4,047 feet high, bearing S.E. ¾ S., distant 27 miles, and Black bluff, 4,381 feet high, S. ¾ E. 24 miles, from Round hill point. But the most worthy of notice of these mountains appears to be Valentine peak, S. by W. ¾ W. 21 miles from the point: this peak is a bare mass of granite 4,100 feet high; and as it glistens in the first beams of the morning sun like an immense spire, it becomes the most remarkable hill feature on the north coast of Tasmania.

From Friend point, Flinders point bears W. ¾ N. distant 2¾ miles, and the coast between the points forms a bay having three bights, behind the south-easternmost of which is a lagoon of fresh water. The south-eastern, and apparently greater part of the bay is fronted by a continuation of the shoal flat which projects from Friend point, with its 3-fathoms edge extending two-thirds of a mile from the shore. A small bight in the edge of the flat, close to West reef, affords anchorage in 3 to 5 fathoms, sheltered from all winds between W. by S. round by South, to N.E. by E., with the dry part of West reef bearing W. by N., distant half a mile. There is a detached patch on the east side of Flinders point, with 3 feet water on it, lying about E. ½ N. two-thirds of a mile from the eastern part of Flinders point. There is a channel above two-thirds of a mile wide, with 6 to 8 fathoms water, between this bay and Hebe reef.

FLINDERS POINT is a headland projecting two-thirds of a mile from the line of coast, and is nearly half a mile broad; a shoal, with dry and covered rocks on it, extends a quarter of a mile northward from the point.

BADGER POINT and ASBESTOS HILLS.—Badger point, S.W. 3½ miles from Flinders point, and another projection 1½ miles to the southward of Badger point, are rocky and form the north-western termination of the Asbestos hills, in which the stone of that name is found; the hills are from 1,240 to 1,350 feet high, and in clear weather, are conspicuous objects to passing vessels. From the rocky projection to the southward of Badger point a low shore curves in a S.W. ½ W. direction 4 miles to a spit forming the south-east side of the entrance of port Sorell.

PORT SORELL.—The north-western entrance head of port Sorell, which lies S.W. by W. ½ W. 5½ miles from Badger point, projects above a mile from the line of coast, and is fringed by a reef of rocks. At about a mile to the south-eastward of the head is Carbuncle islet, which is connected with the shore by the reef, and forms the west point of the entrance over the bar, where there are 6 to 7 feet water; the bar does not shift, and the only unseen danger is a rock on the east side, with an iron beacon upon it. From the bar the channel trends between the shoals, 1¼ miles in a S.S.E. direction, with 2 to 5 fathoms, close up to the south-eastern entrance point; above this a very narrow channel turns about 1¼ miles southward and eastward into the port, where there are 2 to 4 fathoms water, between the Sisters islet on the west, and a broad, but shallow creek on the east side, trending N.E. by E. nearly 2 miles; the east point of the Sisters islet had a temporary beacon on it.

Burges.—This township, which is situated on the west side of port Sorell, about 2½ miles within the entrance, has an extensive jetty, with tramway and trucks, for the purpose of loading vessels.

DIRECTIONS.—Vessels approaching port Sorell from the neighbouring Colonies, should make the land a little to the westward of the port, as the wind during nearly nine months of the year, prevails from N.W., West and S.W., and there is almost a constant current setting to the eastward.

To proceed for the fairway, and avoid the beaconed rock on the east side of the entrance, pass near Carbuncle islet, leaving it on the starboard hand; keep the houses of Burges right ahead, and run between the east point of the Sisters islet and a black buoy which lies off it; after which anchor, in 4 fathoms, off the jetty.

Rubicon River, which flows into port Sorell, is navigable for vessels of more than 100 tons for a distance of 7 miles from the entrance; but its narrow winding channel requires the aid of an experienced person as a pilot, who may be obtained on the spot.

Heidelburgh is a township situated near Green creek, a shipping place about 8 miles up the river.

Supplies.—The exports of port Sorell consist of posts, rails, and paling, besides farm and dairy produce, some of which is shipped at Green cove. There is a shipbuilding yard in port Sorell, where vessels have been launched equal to any in the Colony for strength, model, and workmanship. The timber at this port is of excellent quality, and vessels may be repaired at the current rates.

TIDES.—It is high water, full and change, in port Sorell, at 11 h. 35 m.; springs rise, 8 to 9 feet.

THE COAST.—From the north-western head of port Sorell the coast trends S.W. by W. 7½ miles to the entrance of port Frederick, and may be approached within a mile in 4 to 7 fathoms, except at about 4½ miles to the westward of port Sorell head, where the Horse-shoe reef extends 1½ miles from the shore.

Egg and Wright Islets are two rocks, one on the northern, and the other on the south-west part of Horse-shoe reef, which consists of detached dry and sunken rocks.

PORT FREDERICK and MERSEY RIVER.—Port Frederick is by far the best harbour between port Dalrymple and Circular head, which lies nearly 70 miles to the westward of that port, and is easy of access to vessels of 300 tons. Mersey river, which flows into port Frederick, is navigable for about 6 miles.

The entrance to port Fredrick may be easily known by its western head being high land covered with foliage, except the extreme point, or bluff, upon which there was a bare pole, to be replaced by a white obelisk.

A reef, discernible from the broken water on it, projects a considerable distance from the east side; and there is a bar across the entrance, consisting of hard shingle, which is not known to shift. The depth of water on the most shallow part of the bar, at low tide is 6½ feet; at springs there are sometimes 19 feet water; and an average depth of 16 or 17 feet on the bar at high water, may be depended upon throughout the year. There is a white buoy moored outside the bar.

Torquay and Formby are two townships situated opposite each other, at the entrance, or what is generally termed the heads, of port Frederick, between which there is ferry communication.

Torquay is a telegraph station. A steam-vessel plies once a week to Launceston, and it is expected that the railway will be extended to here before long. Shipping requirements are met by a jetty. The district is agricultural, but it has been found to possess considerable resources in copper, iron, and coal. The population of Torquay in 1881 was 370, and of Formby 162; of the district 6,082.

Pilot.—A licensed pilot, who also acts as harbour-master is stationed at Formby, and boards, outside the white buoy, all vessels requiring his services. Strangers should, therefore, anchor outside the bay, when the weather will permit; or stand off and on, keeeping the Union-jack flying at the mast head until boarded. There is good anchorage in 7 fathoms, outside the bar; but vessels should bring up well under the west head, so as to have sea-room when getting under way, and to avoid the reef which projects from the east side of the entrance.

DIRECTIONS.—Vessels approaching port Frederick from the eastward, in standing along the coast, must keep a good look-out for Egg and Wright islets, on the dangerous Horse-shoe reef. But, as a general rule, the land should be made a little to the westward of the port to which a vessel is bound in this locality, in consequence of the prevailing westerly winds and easterly current.

Having made the land just to the westward of port Frederick, and passed Don bluff—which is a cleared piece of land, with dead trees upon it, about 2 miles to the westward of port Frederick—round the west head of the entrance of the port, and steer for the opening of Mersey river, leaving the white buoy, outside the bar close on the starboard side. Two land beacons will then be seen ahead, one being a tree without branches, painted white, and the other a spar with cross cleats, forming steps; keep these two beacons in line, and proceed inward, leaving the barrel beacon, which marks the Mussel rock, also on the starboard hand, and anchor off the jetty.

Latrobe.—The townships of Latrobe, Balahoo, and Tarleton are situated at the head of the navigable part of the river. The wharves at Latrobe have tramways and trucks for unloading vessels; and good commodious buildings have been erected for stowing grain and other produce. Latrobe is 7 miles S.E. of Torquay; it is a telegraph station, Population in 1881, 711.

Supplies.—Port Frederick possesses many natural facilities for repairing vessels, as they may be laid upon the hard shingle without the least danger, and take advantage of the saw-mills, where every kind of timber, of the best description, may be purchased at a moderate cost, and resident shipwrights may be procured.

Exports consist of timber of every description, coals from the mines in the vicinity, farm and dairy produce, and fruit.

Tides.—It is high water, full and change, at port Frederick, at 11 h. 40 m.; rise, 10 to 12 feet.

DON RIVER, 1½ miles to the westward of port Frederick is narrow, although quite safe for vessels of 100 to 200 tons, which have kept up a trade with this port. Don bluff is higher than the west head of port Frederick, and has cultivated land and dead trees upon it. A reef, which projects a quarter of a mile from the bluff, serves to break the sea from the immediate entrance.*

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* The harbour, which has no bar, admits vessels drawing 11ft. 4in., has a breakwater with a *red* light visible 6 miles, and can be entered except during heavy N.W. gales *Australian Handbook*, 1883.

Although there is no bar at the entrance of Don river there are only 4 to 5 feet at low water; but at high water, springs, there are 12 to 14 feet. A buoy is moored, with a heavy anchor and chain, to the north-westward of the mouth of the river, and another buoy was being laid down in mid-channel one cable from the immediate entrance. These buoys may be passed on either side, and are fitted with shackles, to enable vessels to warp in or out.

Pilot.—Strangers may be sure of obtaining assistance from the heads of Don river, by sending a boat on shore; or they may procure a pilot at port Frederick, by standing off that port, with the Union-jack flying.

DIRECTIONS.—After making the entrance of Don river, at a little to the westward of it, as directed for the neighbouring ports, stand in for Don bluff, and having passed the buoys on either side, proceed in, leaving a beacon at the end of the western reef, on the starboard hand, and with the prevailing north-westerly winds, luff up to the jetty, or run the vessel aground upon the bank, which may be done with perfect safety.

Don is a township near the mouth of the river Don. The population in 1881, was 400, chiefly employed by the Don Trading company.

Supplies.—Several vessels belong to the proprietors of the coal mines in the vicinity, and there is every facility for repairing vessels in Don river, there being a "*gridiron*," by means of which the bottoms of vessels of 300 tons may be repaired. There is a steam saw-mill in constant work, with excellent timber of all kinds, fit for shipbuilding; and resident shipwrights may be engaged at the shortest notice, and on reasonable terms.

Exports.—Piles of the largest dimensions may be procured, and there is a constant export of timber, both sawn and split; also coal, and farm produce.

TIDES.—It is high water, full and change, in Don river, at 11h. 35 m.; springs rise, 8 to 9 feet.

FORTH RIVER, the mouth of which forms port Fenton, lies 4 miles to the westward of Don river, and has a bar at the entrance, which until within the last few years, was fordable on foot, at low water. A reef projects from each head, and the entrance is difficult of access, on account of the changing nature of the channel. At N. by W., one mile from the mouth of the river a bank is said to have been formed, upon which the sea breaks at low water. Forth river is deep within the bar, and vessels of about 100 tons load afloat, alongside the stores erected on the bank of the river.

PILOT.—Regular traders are assisted from time to time, by marks, or beacons placed on the land to show the channels; but strangers should hoist a signal for a pilot, especially in rough weather, when the sea breaks across the bar.

DIRECTIONS.—In making the heads of Forth river, keep well to the westward, to counteract the easterly set, and steer for the entrance; bring mount Roland, a precipitous mountain, 4,047 feet high, which is situated S. by E. 19 miles from the entrance, to bear nearly S. ¾ E., and proceed as guided by the marks and beacons.

Leith.—The township is situated on the eastern side of the river, near the entrance or heads.

Hamilton is situated on both sides of the river, about 2 miles from Leith, a bridge spanning the river. It is a telegraph station.

The land in this vicinity is of a superior quality.

Exports.—The exports of Forth river consists of posts, rails, paling, and farm produce.

TIDES.—It is high water, full and change, in Forth river, at 11h. 30m.; springs rise, 10 feet. In this, like the other rivers on this coast, the tide streams are rapid; and the ebb is accelerated in winter by the river freshets. This, together with the seldom-failing night calms and early morning land breeze, enables vessels to make a good offing before meeting the sea breeze.

LEVEN RIVER.—The entrance of this river, which is open to the north-eastward, lies between masses of irregular and pinnacle-shaped rocks and ledges, with a bar across. The mouth is 3½ miles to the westward of Forth river, is wide and well sheltered from the prevailing westerly winds by the reefs of rocks extending three-quarters of a mile from Dial point the western entrance head, under the lee of which there is good temporary anchorage outside the bar in moderate weather for vessels awaiting the tide. The coarse sandy bar at the entrance of Leven river, which seldom alters, is fordable on foot, at low water, but at high water, generally has 9½ feet water on it.

Bar or channel rock lies a quarter of a mile in a north-easterly direction from Black Jack rock, which has a white beacon on it, and this bar rock is the principal danger in Leven entrance. Half-tide rock lies about half a mile to the eastward of Bar rock, this rock is sufficiently distant from the entrance not to form a danger if its position is known: its name signifies its depth.

Bar or channel rock dries one foot at low water, and in respect of its hidden character at nearly all times of tide, as well as in respect of its position, may well be considered a serious obstacle to navigation. Black Jack rock with its beacon is an excellent guide. There is only one obstruction after the bar is crossed, this is Mussel bank, a bed of stones and gravel 300 feet long by 30 broad, dry at low water.

Ulverstone.—This township is situated on the east bank of Leven river, at a short distance within the entrance. A steam-vessel plies to Launceston once a week.

Pilot.—Vessels of 80 to 100 tons frequent Leven river, it being commodious and safe for vessels of light draught, to go in or out; but strangers should make a signal for assistance before entering.

DIRECTIONS.—In coming from the eastward, make for a gap in Dial range, on the west side of Leven river, and when off the entrance, steer for Black Jack, a large isolated round rock, having a white beacon on it, which is the second beacon observed in standing in. When Black Jack is covered there is said to be 10½ feet water on the bar. To the eastward of this is Half-tide rock, uncovered at half-tide, which will be avoided by keeping Black Jack rock bearing South. Leave Black Jack rock on the starboard hand, and anchor off Macdonald's public-house, which is situated in the township of Ulverstone.

Exports.—The exports consist of split timber of every sort; the timber is of good quality, and well adapted for ship-building and railway sleepers. Various kinds of farm produce are also exported from Leven river, which, from the fertility of the adjacent land, are likely to increase.

The Climate, like that of the other rivers on this coast, is salubrious, and admirably adapted to invalids.

TIDES.—It is high water, full and change, in Leven river, at 11 h. 45 m.; springs rise, 9½ feet.

Dial Range is a ridge of mountains 1,590 to 2,100 feet high, on the western side of Leven river, between 4 miles West, and 7 miles S.W. of its mouth, and terminating to the northward, in two headlands bearing N.W. by W. and S.E. by E. distant 2¼ miles from each other, the south-eastern projection being Dial point, the western entrance head of Leven river. Both heads are fronted by dry and covered rocks, some of which appear to extend above half a mile from the shore, with 6 and 7 fathoms close outside them. From the north-western of these two headlands the coast trends W. by N. ¼ N. 6¾ miles to Blyth river.

Penguin Creek.—Between Leven and Blyth rivers, this coast is intersected by Penguin creek, which is merely a boat harbour.

The mouth of this creek is sheltered by a small headland from westerly and north-westerly winds, and a ledge of rocks which covers at half tide, partially protects it. The ledge extends in a north-easterly direction a third of a mile from the point west of the creek.

A wooden jetty extends 426 feet in an easterly direction from the western side of the creek's mouth, the jetty was built to shelter the corner in which the creek's mouth is situated. Vessels of 8 or 9 feet draught run in alongside the jetty at high water, and lie aground while taking in or discharging cargo. The scend of the sea towards high water is at times considerable. At about 100 feet off the end of the jetty there is 14 feet water at high tide. There is no bar at Penguin creek; from the end of the jetty seawards the water first deepens gradually and then more rapidly, at a quarter of a mile off there are 4 to 5 fathoms.

Penguin, is a seaport with a telegraph station, on Penguin creek. There are lodes containing silver in the locality; split timber is exported. There is steam communication with Launceston weekly.

BLYTH RIVER is only accessible to small vessels, the entrance being narrow with a dangerous rock in it; which might be removed, as it is a flaky rotten-stone. No vessel should attempt to enter without the assistance of a person acquainted with it. A well-constructed bridge over the river, one mile above the heads, is crossed by the Circular head road.

Supplies.—Small vessels frequent Blyth river for paling, posts, and rails; and there is a large quantity of good splitting timber in the vicinity where the land is of excellent quality.

District Boundary.—Blyth river is the western boundary of the police district of port Sorell, and also divides the Customs survey from that of Circular head; the two surveys being under the immediate superintendence of sub-collectors of Customs, which officers are also police magistrates.

ROUND HILL POINT.—Round hill point, W. by N. ½ N. 1¾ miles from Blyth river, is surmounted by a hill 760 feet high. Between Round hill point and Blackman point, W. by N. 2¼ miles from it, is Emu bay, into which flows the small river of that name.

EMU BAY is 2 miles broad by three-quarters of a mile in depth, and is open to all winds from north round to east: it has a very even bottom and good holding ground. Its disadvantage is that during easterly winds embarkation or disembarkation is not always possible. Emu bay is reported as affording safe anchorage in all weathers to sea going vessels of any size possessing good ground tackle. The water in the bay deepens rather suddenly to 25 feet at low water, which depth is found at 300 feet from the end of the jetty. The jetty at Emu bay, is formed of concrete; it is about 144 feet long, and has 8 feet at low water at its extreme.

Emu bay is a post town, with a telegraph station, in an agricultural district. There is steam communication with Launceston once a week.

The COAST.—From Blackman point, which has a rock close off it, connected by a reef, the coast curves W. by N. ½ N. 7 miles to a sandy projection, between which and cape Table, N.W. ½ N. 3½ miles from it, is a bay with reefs extending above half a mile from its southern shore. Inglis river flows through the reefs into the bight of the bay. The coast between Blackman point and the bay is bordered by a reef, and is intersected by several streams, of which the largest is Cam river, 3¾ miles westward of Blackman point.

INGLIS RIVER.—The mouth of the river is open to the north-eastward, at about 3 miles S.S.E. of cape Table, and is protected from all winds to the westward of N.N.W. by the cape; it is further protected by a ledge of rocks running out to the north-eastward from the left bank of the river, upon which ledge an embankment of stones has been formed; it is also protected from the eastward by ledges of rocks extending from the shore in that direction. There is said to be no outer bar at the Inglis; the depth over the inner one is from 8 to 8½ feet.

At the wharves in the river there is only 5 feet at low water and not much room in the stream. Vessels drawing 8 feet use the Inglis and lie aground while taking in cargo. On the right bank of the river a wooden embankment has been formed 450 feet long, which is said to have had the effect of driving the bar seaward for a considerable distance.

CAPE TABLE is the cliffy extremity of a woody flat-topped piece of land 380 feet high, visible, in clear weather, at the distance of 26 miles.

From cape Table the coast extends W. ¾ N. 7 miles to a low point surmounted by the Sisters, two remarkable round hills 870 feet high. A reef, having a small islet on it, projects N.N.W. nearly one mile from the point; and a detached patch lies E.N.E. about half a mile from the islet. There is a small Boat-harbour at 5 miles westward of cape Table. On the west side of Sisters point is a sandy bay, with 2 fathoms water near the shore, and a small stream flowing into it; this bay is apparently protected from the eastward by the reef, with the islet on it, which projects from the point. The shore from Sisters point to Rocky head, at N.W. ¾ W. 5 miles from it, is bordered with rocks; but it may be approached within a mile in 9 and 10 fathoms.

ROCKY HEAD has a high pointed summit, with other peaks in the rear, rising to the height of 1,000 feet. The head is bordered with rock; and a rock 2 feet dry at low water, and surrounded by a reef, lies N.E. nearly 1¼ miles from the head.

SAWYERS BAY extends from Rocky head W.N.W. 11 miles to Circular head, and is 3½ miles deep, with low sandy shores, except between Detention river, S.W. by W. 3 miles from Rocky head, and Black river, S. by E. 5 miles from Circular head; the intermediate shore being rocky, with hills rising behind it. From 19 fathoms water 2 miles northward of Rocky head, there are 16 to 8 fathoms across the bay to about 2 miles south-eastward of Circular head, with 3 fathoms close off the beach near

Detention river, and 3 to 7 fathoms in the bight close to the southward of Circular head.

Anchorage in Sawyers bay can be obtained in the bight to the south-eastward of Circular head, in 5 to 8 fathoms water, sheltered from westerly winds.

TIDES.—It is high water, full and change, in Sawyers bay, at 11h. 40 m.; springs rise 9 feet. The north-west stream begins 2 hours before high water.

CIRCULAR HEAD is the east point of a peninsula which projects N. by W. 4½ miles from the coast, and is half a mile to 1½ miles broad; the isthmus which connects this peninsula with the mainland is low and narrow, with an inlet on either side. The head, which appears from the eastward, like a small flat-topped island, is a singular mass of trappean rock, rising abruptly from the sea to the height of 486 feet, and is visible in clear weather from a distance of 30 miles. A slight covering of withered grass, with only some green bushes, gives it a smooth appearance. The head is connected with the peninsula by a narrow neck of lower land.

The rocky North point of the peninsula lies N.W. ¼ N. 3¾ miles from Circular head, and has a dangerous rocky ledge, just awash, extending E.N.E. three-quarters of a mile from it, on which several vessels have run; it may be avoided by keeping the bluff extremity of the head open of an intermediate projection of the land. Shoal water also extends one mile north-westward from the North point.

The north-east side of the peninsula is divided into Half-moon bay and a sandy bight to the south-eastward of it, by a rocky projection, with dry rocks close off it N.W. by N. 1½ miles from Circular head. There are 12 to 14 fathoms water within 2 miles of this side of the peninsula, and there are 4 to 6 fathoms in the sandy bight on the north side of the head.

The soil on the peninsula is generally of a poor light nature, and not well watered. English grasses have, however, been sown with great success; but English fruit trees planted there suffered much from blight, brought by west winds. In the park at Hyfield there were, in a thriving condition, some fallow deer brought from England.

Stanley is a rather important seaport town. It was laid out by the Tasmanian Land Company, and is situated on a flat, lying East of Circular head, facing the bay on the south side of the head. It is the nearest port to Melbourne, and there is regular communication weekly with Launceston by steam-vessel. The district is agricultural, and there is a large trade with Victoria, the export of potatoes alone being very great. There is a telegraph station here. The population of Stanley is 332, and of the district 1,380.

PERKINS ISLE and BAY.—From the south extreme of Circular Head peninsula a low sandy beach trends W. by S. ½ S. 7 miles, where it terminates in a low point, separated by a narrow opening from the south-east point of Perkins isle, which extends thence N.W. 4 miles, and is 1¾ miles broad at the centre. The west side of the peninsula, the sandy beach trending westward from it, and the north-east side of Perkins isle, together, form a bay, which extends from the North point of the peninsula W.S.W. 9 miles to the north-west extreme of Perkins isle, and is 4½ miles deep. There are 8 to 4 fathoms water across the entrance of the bay, with regular soundings towards the shore, affording good anchorage.

The south-west extreme of Perkins isle is separated from the mainland by a narrow opening; this and the other opening between the south-east point of the island and the spit of the sandy beach, communicate with Duck bay a land-locked sheet of water nearly 5 miles long, East and West, and 2 miles wide, with Duck river flowing into its south, and a smaller stream into its east corner. Inside the entrance of Duck bay, vessels can anchor safely in any winds in from 3 to 4 fathoms water, sandy bottom.

Duck bay.—A black fairway buoy is placed in 4 feet at low water in mid-channel, and a white buoy on the end of the sand-spit off Perkins isle, at E.S.E. three-quarters of a mile from the black buoy. Keep the white buoy on the west side. There are from 3 to 5 feet in mid-channel at low water between the buoys, and from 2 to 4 fathoms between the white buoy and the mouth of Duck river.

From the south-west extreme of Perkins isle the coast extends 12 miles in a W. by N. direction to the east entrance point of Welcome river. This coast consists of small inlets and points, and is intersected by two streams at 5½ miles and at 10 miles from Perkins isle. A small islet lies close off the mouth of each stream, and Long islet lies half a mile north-eastward of the east entrance point of Welcome river.

ROBBINS PASSAGE, which separates Robbins island from the mainland, is bounded to the southward by Perkins isle and the coast from thence to Welcome river; and to the northward, by Robbins island. The eastern entrance of the passage, which appears like the mouth of a river, is about one mile wide between the north point of Perkins isle and the south-east extreme of Robbins island, to the northward of it; but there being an islet in the middle of the entrance connected with Perkins isle by a bar, a narrow passage only remains between the islet and Robbins island. Small vessels will find good anchorage in the mouth of this opening, sheltered from all winds.

Immediately within its entrance Robbins passage is 4 miles wide, with 5 to 2 fathoms water, from whence it contracts to two-thirds of a mile in width at about 7 miles within the eastern entrance, the channel being apparently blocked up westward, by the banks which extend from both shores, some of which dry at low water. Two small islets, or rocks lie nearly in mid-channel 4½ miles within the eastern entrance; and 5 miles farther to the westward there are two others lying close to the south-west extreme of Robbins island. From the western entrance, which is one mile wide, a narrow 2-fathoms channel trends to the northward between the west point of Robbins island and Long isle, which lies about one mile to the westward of the point; from thence the channel, with 2 to 3 fathoms water, continues 3 miles farther in the same direction, through shoals extending from Robbins island to the mainland westward of it.

From Welcome river the general trend of the coast is N.W. 6 miles to Woolnorth point. The western side of the mouth of Welcome river forms a projecting point, on the west side of which is a small inlet, with an islet close off it. There are several islets and rocks close to the east side of Woolnorth point, the largest two being Murkay and Harbour islets, the former lying one mile to the south-eastward, and the latter close to the north-eastward of the point; besides these, an islet lies 1½ miles to the northward of the point, with which it is connected by a reef that extends to within a quarter of a mile of Murkay islet.

WOOLNORTH POINT, the north-west extremity of Tasmania, is rather low and rocky, but the adjacent soil is most productive. At 3 miles from the point is an out-station of the Tasmanian Agricultural Co.

HUNTER GROUP consists of three principal, and many small conspicuous islands, extending N.W. ¾ W. 28 miles from the south-east extreme of Robbins island to Albatross islet, and N.N.E. ½ E. 18 miles from Woolnorth point to the north-east extreme of Three Hummock island, and includes Black Pyramid, which bears W.S.W., 21 miles from cape Keraudren.

ROBBINS ISLAND, the south-easternmost and second in magnitude of Hunter group, and of which the southern side has already been described with Robbins passage, is a sandy island of a somewhat triangular form, with sides 7 to 8 miles long. There are 6 fathoms water over a sandy bottom, at one to 2 miles eastward of the south-east point of Robbins island, and 6 fathoms on foul ground, close off Guyton point, a rocky projection 3 miles north-westward of the south-east point. Guyton point divides the north-east side of the island into two sandy beaches, the north-western, and more extensive of which forms a slight indentation, with 5 and 6 fathoms water to 3 miles off it. Between the north-west end of this beach and the north point of the island are two small inlets. The north-west side of Robbins island is fronted by a shoal, on which a small islet lies near the shore 2 miles south-westward of the northern point.

Water may be procured in the neighbourhood of the south-east point of Robbins island; but the anchorage near it is exposed to all winds between North and East.

Walker Isle, when examined by Lieutenant Robbins in 1800, formed part of Robbins island, from which it has since been separated by a narrow opening caused by the encroachment of the sea. Walker isle is 3 miles long, N.N.W. and S.S.E., and one mile broad, with rocky shoals extending from its western side and northern end. Between half a mile and 1½ miles N.W. from the north point of the island is a bight having 6 to 8 fathoms water in it, its western side being formed by a narrow 6-feet spit, projecting 1½ miles to the northward, and its east side being formed by the shoal, on which are situated the Petrel islets, extending N.N.E. nearly 2 miles from the north point of Walker isle.

Petrel Islets are a cluster of small islets and rocks, the largest two of which lie respectively, North half a mile, and N.N.E. 1½ miles from the north point of Walker isle; the outer islet being 74 feet high.

A sandy bank lies nearly 3 miles to the westward of Walker island, with apparently an extensive shoal flat about it.

Tomatin Bank, on which the barque of that name grounded in 1865, and had to throw part of her cargo overboard, is reported by her commander, Mr. Brown, to lie N.E. by E. ¾ E. 4¾ miles from the north Petrel islet, with the north-east point of Three Hummock island bearing N.W. by N., distant 9 miles. The chart shows 10 to 12 fathoms water close to the eastward of this danger.

THREE HUMMOCK ISLAND, of which the south point bears N.N.W. ¼ W., distant 6 miles from the north point of Walker isle, is the north-easternmost and third island in magnitude of the Hunter group, being 6 miles long, N.N.E. and S.S.W., and nearly 5 miles broad. It is of an oval form, with a bay on its north-west side, and a coast ridge of moderately elevated land, partly bare of vegetation, extending from the south to the north-east point of the island. Three hills, from which the island derives its name, rise gradually from this ridge, the southernmost, one mile north-eastward of the south point, being a conical peak 790 feet above the sea, is the most elevated part of the island, and is visible in clear weather, from a distance of 30 miles.

The northernmost hill, one mile south-westward of the north-east point of the island, is 590 feet above the sea, and is visible in clear weather from a distance of 27 miles. At a distance of 1½ miles to the southward of this hill, is the third and intermediate hummock.

Between the south and north-east points of Three Hummock island its coast consists of sandy bays and rocky points. H.M.S. *Norfolk* anchored in 3¾ fathoms, in a small sandy bight of the east coast of the island at the foot of the northernmost of the three hills, and found shelter from North round by West, to S.S.E. There are 8 and 9 fathoms water a little more than a mile off this coast of the island; but breakers project nearly half a mile from the points. The depth of water off the south extreme of the island is irregular, varying from 17 to 6 fathoms one mile from the shore, and shoaling to 2 fathoms at 3½ cables in a S.S.W. direction.

Mermaid Rock is a small sunken danger lying N.W. half a mile from the north-east point of Three Hummock island and nearly North from the northernmost hill; there is deep water close to the rock, and a passage a little more than one cable wide, between it and the shore, through which H.M. cutter *Mermaid* passed.

From the north-east point of Three Hummock island its rocky coast trends West 3½ miles to the north-west point, and from thence S.W. one mile to the north-east point of the bay before mentioned, which extends 2½ miles from N.E. by N. to S.W. by S., and is one mile deep, with a shoal in the entrance, between which and the points of the bay there are 5 to 7 fathoms water. At a short distance behind the beach is a small lagoon of fresh water. A projection three-quarters of a mile to the southward of the south-western point of this bay forms the south-west extreme of the island, which, although rocky, may be rounded within half a mile, in 11 to 7 fathoms water.

Anchorage.—A bay extends S.E. 1¼ miles from the south-west extreme of Three Hummock island, and is nearly half a mile deep, with 4½ fathoms water in its centre, where there is good anchorage, sheltered from the westward by Hunter island, and from the southward by the shoals which extend from Walker isle and the sandy banks to the westward of it. From the south-east point of this bay the coast trends E.S.E. 2 miles to the south point of the island, near which is a dry rock.

Water is plentiful on Three Hummock island, the *Beagle* having been supplied from wells dug on the north point of a sandy bay on the south-east side. The island is covered with an impervious scrub, the trees being small and stunted.

There is a passage 4 miles wide, between the south point of Three Hummock island and Petrel islets, having depths of 12 to 14 fathoms, which extends from 1½ miles north-eastward of the northern Petrel islet to the south point of Three Hummock island.

HUNTER ISLAND, the westernmost and largest of the Hunter group, and formerly known as Barren island, is 12½ miles long, North and South, and in form somewhat resembles a closed hand, with the forefinger extending North, and the closed fingers facing West, at the middle and broadest part of the island, where it is 4 miles across, with a small rocky bight on the west side. The southern part of Hunter island is 2 miles broad, but the northern part, from 1½ miles in breadth near the middle, narrows gradually, for a distance of 6 miles to cape Keraudren, the north point of the island. It is moderately elevated, the highest parts being a hill 300 feet high on the east side of the middle of the island, and another 292 feet high, at 3½ miles from the north point. Its northern part has a most barren and sterile appearance, but its southern coasts are formed by wooded hills of moderate height.

The east side of Hunter island is nearly straight, North and South, and has small sandy bays between its slightly projecting points, off which there is good anchorage in a moderate depth, with shelter from all but easterly winds. There are 10 and 12 fathoms water close to the south point of the island; but a bank, with 2 to 3½ fathoms on it, borders the east side between 2 and 5½ miles from the south point, with its northern end extending 1½ miles from the shore. From the north extreme of this bank to the north point of the island, there are 12 to 7 fathoms water within half a mile from of the shore.

Stack Islet, 140 feet high, about one mile to the eastward of the south point of Hunter island, is small, rocky, and destitute of vegetation; with rocks and shoals projecting about a quarter of a mile from its north-east and south-west extremes. There were 22 fathoms, gravel, at a quarter of a mile and 18 fathoms at 1½ miles, from the south side of the islet, with quickly-decreasing depths south-eastward, in the direction of the banks which extend from the mainland.

Penguin Islet, small and rocky, on the north-western edge of the shoal water which appears to extend from Walker isle, lies N.N.E. ½ E. 2 miles from Stack islet. There is a narrow channel, with 6 to 7 fathoms water, between Penguin islet and the south-east extreme of Hunter island.

The channel between Hunter and Three Hummock islands is 2 to 3 miles wide, with 7 to 17 fathoms water, and apparently no other hidden dangers than the rocks which closely border the west point of Three Hummock island.

Anchorage.—The best anchorage for large ships on the east side of Hunter island is said to be in 14 fathoms, distant nearly 2 miles, with the island bearing from N.W. by N. to S. by W., and the west point of Three Hummock island North about the same distance. The approach to this anchorage between these two islands, is said to be safe under the guidance of the lead, taking care to avoid Mermaid rock, off the north side of Three Hummock island.

TIDES.—It is high water, full and change, at the anchorage on the east side of Hunter island, at 10 h. 30 m., springs rise 8 feet. The western stream begins 3½ hours before high water.

Cuvier Bay, which extends N.N.E. ¼ E. 6 miles from the north-west point of Hunter island to cape Keraudren, the north point, is 1¾ miles deep in its southern part. As this bay is entirely exposed to westerly winds, it cannot afford desirable anchorage; the ground, however, is clean, the bottom being everywhere sand, and the depth variable between 8 and 12 fathoms. The coast in the bay is steep, and may be closely approached, except near the northern part.

The southern end and west side of Hunter island are rocky, and as dangerous rocks and breakers extend considerably to seaward from the north-west point of the island, it should be carefully avoided.

CAPE KERAUDREN is a low sloping rocky point with 23 to 24 fathoms water within half a mile of it. A dangerous reef, upon which the sea breaks, lies W. by S. ½ S. between 1½ and 2 miles from the cape; there is said to be a good passage between the reef and Hunter island.

NO PASSAGE.—TIDE STREAMS.—There is no passage between Hunter island and the north-west extreme of Tasmania, owing to the numerous islets and reefs with which this space is studded; no vessel should therefore be induced to approach it. The tide streams to the westward of these islets and reefs run at the rate of 2 knots, flowing to the N.E.

Trefoil Islet, W. by N. 2 miles from Woolnorth point, is nearly one mile in extent, and receives its name from its resemblance to a clover leaf; reefs extend from its north-west and south-east extremes.

Bird, or Long Islet, N.E. ¼ N. 2¼ miles from Trefoil islet, is one mile long, North and South, and nearly connected by rocks and reefs with the south-west extreme of Hunter island. There are 6 fathoms water one mile to the eastward of Bird islet, and from 6 to 9 fathoms on the east side of some rocks which extend between it and Woolnorth point.

Steep Islet, 250 feet high, N.W. ½ N. 2½ miles from Bird islet, is about half a mile in diameter, and, as its name implies, has a margin of steep cliffs. There is a space of nearly 1½ miles between Steep islet and Hunter island, but it is so much occupied by small, though conspicuous rocks, that it cannot be safely used by ships. There are also numerous dry and sunken rocks between this and Trefoil islet, preventing any safe passage that way.

South Black Rock, W. ½ S. nearly 4 miles from Steep islet, is a high round mass 130 feet above the sea, with a reef extending from its south side, close to the southward of which there are 23 to 36 fathoms water; and there are 19 fathoms between this rock and Steep islet.

North Black Rock, which is much smaller than the South Black rock lies N. by E. ¼ E. 5½ miles from it, and W. ¼ S. 3 miles from the north-west point of Hunter island.

Albatross Islet, the north-westernmost of the Hunter group, lies W. ½ N., 6 miles from cape Keraudren the north point of Hunter island, the islet is three-quarters of a mile long, North and South, a quarter of a mile broad and 125 feet high, being visible in clear weather, at a distance of 16 miles. Its shores are mostly steep cliffs, and it is rocky and straggling at the extremities, with breakers lying a little way out from them; when seen from a S.W. by W. or N.E. by E. bearing, a deep notch in the middle of the island, appears to divide it.

Caution.—Soundings are no indication of a vessel's approach to Albatross isle, there being 25 to 34 fathoms within 1¼ miles of its west side, and 31 fathoms at three-quarters of a mile from its north end, over a coarse ground with sand and shells. These depths correspond so nearly with what will be found towards King island and for several miles to the westward of it, that in the night, or in thick weather, it ought to be approached with caution.

BLACK PYRAMID, S.W. by W. ¼ W. 15 miles from Albatross islet, is the most prominent of the islets extending westward from Hunter island, and is the first that will be seen by a vessel approaching the Hunter group from the westward. Black Pyramid is a small dark-looking islet, with a round summit, 240 feet above the sea. It appears bold to approach, there being 24 and 25 fathoms within a mile southward, eastward, and northward of it.

CHANNEL between TASMANIA and KING ISLAND.—This channel between Hunter and King islands, although it is 38 miles wide, and the positions of the islets in it are correctly known, is little used by vessels going through Bass strait, as they generally prefer the safer entrance, between King island and cape Otway.*

REID ROCKS.—The north-westernmost and highest of these rocks, which lie in the north-western part of this channel, is a small dark mass 40 feet above the sea; it bears E. by S. ½ S., distant 11½ miles from Stokes point, the south extreme of King island, and has a rock dry at low water E. ¼ S. half a mile from it. The other patches of this cluster lie, respectively, E.S.E. one mile, and S. by E. 1⅔ miles from the north-westernmost rock, and the latter patch has a rock 6 feet above water on it. There are 27 fathoms one mile north-eastward of Reid rocks, and 35 fathoms between 3 miles to the south-eastward and south-westward of them, showing that the lead is no certain guide for approaching these dangers at night or in thick weather; and as the tide streams here run with rapidity, a vessel should avoid them at such times, unless her position has previously been well ascertained by a sight of the land on either side.

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* *See* Admiralty chart, Bass strait, No. 1,695*b*; scale, $m = 0{\cdot}2$ of an inch. Also King island, No. 404; scale, $m = 0{\cdot}49$ of an inch.

BELL REEF, bearing S. by W. ½ W., distant 8½ miles from the north-westernmost Reid rock, and S.E. ¾ S. 14½ miles from Stokes point, is about 1¼ miles long, N. by W. and S. by E., and a quarter of a mile broad, with 33 fathoms E.S.E. one mile from its south extreme, and 36 fathoms, sand and shells, midway between it and Reid rocks.

This rock lies much in the way of vessels using the passage southward of King island, and is the more to be avoided as the sea was only seen to break at intervals on it, even with a heavy swell.

Clearing Marks.—In proceeding eastward or westward, Black Pyramid being kept on an East bearing, will lead 2½ miles southward of Bell rock: and in going northward or southward, the north-westernmost Reid rock being kept on a North bearing, will lead 2 miles eastward of the reef.

Soundings.—There is no bottom in 220 fathoms, at 47 miles S.W. ½ S. of Black Pyramid; but at 35 miles from it in the same direction, there are 70 fathoms, sand and shells, with regular soundings in 44 to 35 fathoms, between that depth and Black Pyramid. In the channel between the Hunter group and King island, the soundings generally range from about 24 to 36 fathoms, the deepest water being 44 fathoms, at about 6 miles to the westward of Albatross islet.

DIRECTIONS.—The channel between the Hunter group and King island, as before stated, is not recommended; and as there is a possibility of dangers still lying undiscovered, between King island and the north-west extremity of Tasmania; the safer passage between, King island and cape Otway, should be preferred. But should a vessel be in such a position as to make it desirable to enter Bass strait by this channel, she should keep well to the southward of Bell reef, and pass close to Black Pyramid, which, as before noticed, being brought to bear East, would lead about 2½ miles, to the southward of this danger. Or, with a commanding breeze, a vessel may pass between King island and Reid rocks, without danger, by keeping well over on the north-western side, and paying attention to the tide stream, which sets across the channel, occasionally with some strength.

Tidal Streams set through mid-channel between King island and Hunter group from one to 3 knots, the flood to the north-eastward, and the ebb to the south-westward.

WEST COAST OF TASMANIA.*

The west coast of Tasmania is generally a rocky shore, of sterile aspect with reefs fronting it to the distance of 3 or 4 miles in some places, and a heavy swell usually rolling in upon it from the S.W. The prevailing winds are from the same quarter, and bring much bad weather, especially in the winter months of June, July, and August. An experienced resident in that country has observed:—"Whenever the wind veers round to the S.E., or is easterly, it is certain intimation of fine weather; but whenever the wind shifts against the sun, bad weather is sure to follow. Mariners will, therefore, do well to pay attention to the state of the wind, which affords almost infallible prognostics of good or bad weather."†

CAPE GRIM, the north-west cape of Tasmania, is a steep black head, close off which are the high conical Doughboy and Steeple rocks, nearly of the same description as the cape. The coast between Woolnorth point, the north-west extremity of Tasmania, and cape Grim consists of a sandy beach and a rocky point, fronted by dry and covered rocks.

Caution.—At a distance of 4 miles S.S.W. from the high conical rocks which lie close to cape Grim, and 3 miles from the cliffy shore abreast there are 120 fathoms, on a sandy bottom. A shore so steep should therefore be avoided in the night, or in thick weather, especially with the wind blowing from the westward.

TIDES.—It it high water, full and change, at cape Grim, at 10 h. 30 m.; springs rise 8 feet; the south-west stream begins at 3½ hours before high water, flowing at springs, with a velocity of 5 knots, and at neaps 3 knots.

Studland Bay.—To the southward of cape Grim, black cliffs extend nearly 5 miles to the northern Bluff point, on the east side of which is Studland bay, a small exposed sandy bight with an islet in it.

Boat Harbour.—From Studland bay the coast trends S. by E. ½ E. 4½ miles and S. by W. 5½ miles to the northern Boat harbour, from the bight of which Green point stretches out nearly 1½ miles to the north-westward. There is a rock close off Green point, and a reef lies nearly one mile to the south-westward of it. Within the reef is a small bay, from the inner part of which the coast trends S.W. ½ W. 2½ miles to West point.

WEST POINT, so named from its being the westernmost point of Tasmania, is a sandy projection, enclosed by dry and covered rocks, in lat.

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* *See* Admiralty general chart of Tasmania, No. 1,079; scale, $m = 0{\cdot}11$ of an inch.

† Mr. G. W. Evans, Surveyor-General in Tasmania, in his Geographical, Historical, and Topographical Description of it, p. 51.

40° 57′ S., long. 144° 38′ E. M. Freycinet could find no bottom at 53 fathoms at 6 miles off the point.

Between West point and the southern Bluff point, which lies S. by E. ½ E. 3½ miles from it, is a bight with an islet near its south-eastern shore, and 1½ miles south-eastward of the latter point is a small opening, close off the entrance of which is Church rock. From Church rock the coast trends S.E. by E. ½ E. 4 miles to Arthur river.

HALLY BAYLEY ROCK, on which the sea breaks heavily in bad weather, has a depth of 3 fathoms on it, and is situated about 15 miles off the West coast of Tasmania. From the rock cape Grim bears N.E. ½ E., distant 17 miles, and West point S.E. by E. ½ E. 14 miles.

ARTHUR RIVER is about half a mile wide at the mouth, and 17 miles above it, in a S.E. direction, it is joined by Hellyer river, a small stream which rises near Valentine peak.

Southern Boat Harbour.—From the mouth of Arthur river the general trend of the coast is S. ½ E. 12 miles to Ordnance point, the Southern boat harbour being an inlet, with a narrow entrance, 7 miles to the southward of the river. Both entrance points of the harbour are fronted by rocks; and Ordnance point has dry and covered rocks lying about 1½ miles off it.

SANDY CAPE, S. by E. ½ E. 11 miles from Ordnance point, projects 2 miles from the line of coast; the cape and the exposed bight between it and Ordnance point, are bordered by reefs of dry and covered rocks. Between the Southern boat harbour and Sandy cape there are 44 to 26 and 45 fathoms water at 4 to 7 miles from the shore, with irregular depths of 35 to 10 fathoms between the former soundings and the reefs.

Between Sandy cape and another projection S.E. ¾ S. 13 miles from it, the coast forms an exposed bight, having an inlet about 7 miles south-eastward of the cape. From the south-east point of the bight the coast trends S.E. by E. ½ E. 5 miles to the entrance of Pieman river, 2 miles to the north-westward of which is a small inlet or creek. There is a patch of dry and covered rocks close off the mouth of Pieman river, and 2 miles to the southward of it are the two Conical rocks, standing on a reef of dry and covered rocks, extending along a projecting part of the coast.

From the two Conical rocks the coast takes a S.S.E. ¾ E. direction 13 miles to a point, one mile within which is a small stream, whence Long Sandy beach curves south-eastward and southward 20 miles to the entrance of Macquarie harbour; at 8 and 14 miles to the northward of which the beach is intersected by two small streams. There are 12 and 13 fathoms water, at 1½ miles, and 20 to 28 fathoms between 4 and 5 miles from the beach.

Aspect.—From West point to about 60 miles southward of it the country is low for 2 or 3 miles inland, it then rises gently to a chain of low barren hills, behind which there is a second chain much higher and better wooded than the first.

Mount Norfolk.—East 10 miles from Sandy cape, is the northern and more elevated of two hills near each other, on the north end of the second chain, which are conspicuous from the offing, and in clear weather, are visible before the coast abreast of them.

MOUNT HEEMSKERK and ELDON RANGE.—Mount Heemskerk N.E. by N. 4 miles from the north end of Long Sandy beach, is the western summit of a ridge extending thence nearly E. ½ S. 26 miles to Eldon range, 4,739 feet high; the former is visible at a distance of more than 30 miles.

Soundings.—From 35 fathoms, rocky bottom, 17 miles westward of Sandy cape, the soundings increase to 106 fathoms, fine white sand and shells, about 30 miles westward of mount Heemskerk, 5 miles outside which the depth decreases to 66 fathoms, rock. About S.W. by W. 27 miles from mount Heemskerk there is no bottom at 120 fathoms, the intermediate soundings being 95 and 91 fathoms; and there are 85 to 91 fathoms between 11 and 17 miles from Long Sandy beach.

CAPE SORELL, is a rocky projection of moderate height, forming between it and the north end of Long Sandy beach an extensive bay, in the southern part of which is the entrance of Macquarie harbour; cape Sorell being the western head of the entrance.

The extremity is low, terminating in straggling bare rocks of brown appearance, and the coast on each side is very rocky and sterile. Many patches of breakers and rocks above water lie detached from the shore; and there is one small rock just above the water's surface, lying N.W. 2 cables from the cape, with apparently no safe channel in-shore of it.*

Watts Hill, E. ¼ N. 1½ miles from cape Sorell, is a conspicuous lump of rock on the north-eastern part of the cape; a rock above water connected with the shore by a reef, lies N.W. 1½ cables from the foot of the hill. There is a small rocky islet E. ¾ N. from the hill and about 100 yards from the shore, the least depth of water between them being 3 fathoms on a sandy bottom, with somewhat less close to the southward of the islet, in a small bight formed in the northern edge of the shoal which extends from the shore. This small nook, although scarcely an eighth of a mile across in any direction, would nevertheless afford shelter in very smooth water, to any vessel which might be caught suddenly by a northwester in the outer road, and be unable to cross over the bar of Macquarie harbour.

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* *See* Admiralty plan, of Macquarie harbour, No. 1,629; scale, m = 1 inch.

MACQUARIE HARBOUR is an extensive sheet of water, trending from its entrance S.E. by E. 17 miles, and 2 to 4 miles wide, with regular soundings within the entrance, ranging from 5 to 20 fathoms; but the entrance is narrow, and obstructed by a 9-feet bar between the outer and inner roads. And it must be borne in mind that the channels are liable to alter in position and depth, owing to the occasional great rush of water out through the banks and shoals, which, being composed of sand are of a shifting nature.

Macquarie Harbour formerly an ultra penal station is now, owing to the tin mines in the locality and King river gold field, a post town and port of entry, with a population of 60.

Frenchman's Cap, 4,756 feet high, bears East, distant 30 miles from cape Sorell, and would probably serve in clear weather, to point out the entrance of Macquarie harbour.

PILOT BAY extends from the foot of Watts hill S.E. ½ E. about one mile to the western entrance point of Macquarie harbour, and has a sandy beach, in the western bight of which, behind some dry and covered rocks, is a small run of fresh water flowing from the swampy land behind it; but this bay is only accessible to boats, on account of its being filled by the western sands of the bar, there being only 4½ feet water on their outer spit, two-thirds of a mile to the eastward of Watts hill The pilot station of Macquarie harbour is abolished.

Mount Anthill, S.S.E. about one mile from Watts hill, is similar to it, but has a remarkable double summit; mount Anthill is situated about half a mile to the southward of the beach of Pilot bay, and is little more than half that distance from the sea to the westward; there is abundance of water near the mount.

ENTRANCE ISLET lies about 100 yards to the eastward of the steep rocky projection which forms the south-eastern point of Pilot bay and the west entrance of Macquarie harbour. The islet is little else than a mass of rock, having some small detached rocks close about it, except apparently, on its eastern side. The proper channel into Macquarie harbour is between this islet and the western entrance point, where there are 7 to 11 fathoms water close to the rocks.

SANDY POINT.—From one-third of a mile eastward of Entrance islet the sandy beach which forms the eastern side of the entrance to Macquarie harbour trends S. by E. half a mile to Sandy point, on each side of which the land is low and sandy for several miles, and covered with shrubs; the land which forms the western side of the channel is steep, and rises to several ranges of irregular rocky hills, amongst which are several masses of quartz, or other white stone, which gave them the appearance of being partially covered with snow.

The western side of Sandy point is fronted by a bank, the outer edge of which extends from the point to Entrance islet, and thence N.N.W half a mile to a 6-feet spit, forming the eastern part of the bar. From this spit the north-eastern edge of this bank trends S.E. by E. to within a quarter of a mile of the beach. There is said to be a narrow channel, with 10 to 12 feet water, close to the eastern side of Entrance islet.

The BAR, which has only 9 feet on its deepest part at low water, lies nearly three-quarters of a mile outside Entrance islet, and separates the outer from the inner road. The soundings outside the bar, from 14 fathoms at 2 miles N.N.E. of cape Sorell, decrease irregularly to 9 feet on the bar. At a quarter of a mile within the shoalest part of the bar the channel is a quarter of a mile wide, with 2 to 3 fathoms water, whence it narrows towards Entrance islet, and the depth increases to 5 and 6 fathoms.

Mount Wellington.—From the western entrance point the shore trends S.E. by S. nearly 1½ miles to the steep south-eastern foot of mount Wellington, a conspicuous hill, bearing South, distant half a mile from Sandy point. This mount rises rather abruptly from the shore on the west side of the harbour, and will be easily distinguished by its table top which is 260 feet above the level of the sea, and is separated from the other hills to the westward by a deep notch, that gives it the appearance of being insulated, before the connecting land becomes visible. There is a white mark about half way up the hills on the south side of the mount.

Bushy Islet, which lies close to the shore, one-third of a mile to the northward of mount Wellington, is small with a round bushy summit and two dry rocks lying one cable to the southward of it. There is a narrow 13-feet channel between this little cluster and the western shore, by keeping the former aboard; as also between it and a small sandy bight at the foot of mount Wellington; but the latter should not be used when it is practicable to pass eastward of Bushy islet.

From Entrance islet to Bushy islet the channel is 1½ to 2 cables wide, with 9 to 4 fathoms water; but from Bushy islet to the foot of mount Wellington, between which and the edge of the eastern shoals the channel is only 2 cables wide, the depth of water varies from 2½ to 4½ fathoms.

Channel Bay extends from the foot of mount Wellington S.E. ½ S. nearly one mile to Round head, and is half a mile deep; a shoal in the middle of the bay, with 6 to 1½ feet water on it divides the channel into two passages; the inshore passage which follows the curve of the bay between the bank and the shore, is about one cable wide, with 2 to 5 fathoms water. The middle passage between the bank and the extensive sand-banks which stretch out from the northern shore, is also about one cable wide, but has only 9 to 12 feet water.

Mosquito Cove is a small sandy bight on the south side of mount Wellington, with a run of fresh water, and good anchorage in 12 to 20 feet water, on a sandy bottom, within 40 to 50 yards of the beach.

The Northern Shore from Sandy point trends E. by N. 1¼ miles, and then sweeps round in a S.E. by E. and N.E. by E. direction 1¾ miles to River point, and is fronted by extensive sand-banks, nearly dry at low water, which form the eastern and northern sides of the channel leading into Macquarie harbour.

The outer edge of these northern extensive sand-banks from Sandy point trends S.S.E. half a mile, and then projects into Channel bay, contracting the channel to a width of 150 yards, but with depths of 7 and 8 fathoms. From 2 cables S.S.E. of mount Wellington the edge of the banks trends S.E., and East nearly one mile to a patch of sand on it, dry at three-quarters ebb, and lying one-third of a mile to the north-eastward of Round head; the depth of water in the intermediate channel gradually decreases from 4 fathoms close to the head, to 10 feet near the edge of the sand. From this drying patch of sand the edge of the banks, which forms the northern side of Kelly channel, trends E. by S. ½ S. 1¼ miles, and then curves N.E. by E. 2 miles to a spit projecting East a little more than a mile from River point.

A small patch of sand, covered at half flood, lies S.E. by E. half a mile from Sandy point; and there was said to be a narrow channel through the sand-banks, winding from the south side of the point close to the sandy shore for about 1¼ miles, and then edging off in a S.S.E. direction, and having a shallow communication with Kelly channel.

Backagain Point.—From Round head to the south-western shore forms a bight extending nearly S.E. 1¼ miles to Backagain point, a high projection, having 4½ fathoms water close to it. The steep elevated shore of this bight is separated from the southern extensive sand-banks in front of it, by a narrow channel, which is said to be finally lost among the shoals to the eastward.

Table Head and Liberty Point.—Between Backagain point and Liberty point, the northern extremity of a narrow sharp ridge of moderate elevation, lying E. by S. 2¾ miles from Backagain point, the coast forms two bights separated by Table head, a high, steep, flat-topped point, E.S.E. 1¾ miles from Backagain point. Each of these two bights is about three-quarters of a mile deep, that to the westward being mostly occupied by shoal flats; but the eastern bight is supposed to be free from dangers, though its depth of water is not known.

Betsy and Bird Islets lie respectively E. by S. three-quarters of a mile, and E. ½ N. two-thirds of a mile from Backagain point; the former, though little more than one cable in extent, is conspicuous; but the latter is a mere rock. Both islets, together with the rocks about them, are connected with, and surrounded by the extensive sand-banks which stretch out 1¾ miles to the northward and north-eastward from Table head, and which are generally covered.

From a narrow bank or spit, with 3 and 4 feet water on it, 3 cables north-eastward of Round head, the outer edge of the extensive sand-banks fronting the south-western shore trends E. by S. ¾ S. 1½ miles, and thence sweeps round eastward and southward 3½ miles to Liberty point. The northern edge of these banks forms the southern side of Kelly channel.

At a quarter of a mile eastward of Round head is the entrance of a blind channel trending E.S.E. 1½ miles in a parallel direction with Kelly channel, from which it is only separated by the narrow ridge which stretches out W.N.W. 1½ miles from the extensive southern sand-banks. This channel is 2 cables wide, with 1¾ fathoms in its western entrance, and 3½ fathoms at three-quarters of a mile within it, but only 6 feet at its eastern end, where the channel appears to be barred across by the sand-banks.

KELLY CHANNEL, the only known passage from the entrance channel into the deep water of Macquarie harbour, is about 100 yards wide, with 9 feet water at its western entrance, between the drying sand-patch north-eastward of Round head, and the narrow bank or spit to the south-eastward of the patch. Thence the channel trends between the northern and southern extensive sand-banks E. by S. ½ S. 1½ miles, with depths of 6½ to 12 feet water. Kelly channel then gradually widens in an E.N.E. direction, to more than a mile in width at its eastern entrance between the sands. From 10 feet water in the narrows, N.N.E. of Backagain point, the depths increase to more than 12 fathoms in the eastern entrance.

Sophia Point is a low projection of the north-eastern shore of Macquarie harbour, lying N.E. ½ N. 2½ miles from Liberty point, and is enclosed by a reef, with straggling rocks extending about 2 cables from it. Sophia point, and River point nearly W. by N. ½ N. from it, form the entrance points of the northern arm of the harbour, which extends nearly 5 miles in a northerly direction.

Pine Cove is a bight in the eastern shore of the northern arm of Macquarie harbour, lying northward between 1½ and 2½ miles from Sophia point. In proceeding from Kelly channel to Pine cove the steep south side of the spit which projects from River point, must be approached with caution, as the soundings are very irregular; but thence the depths gradually decrease to 3 fathoms within the cove, where there is good anchorage for small vessels in the latter depth, with muddy bottom.

Swan Basin, on the western side of the northern arm of Macquarie harbour, extends from one to 2½ miles northward from River point. From the south extreme of this basin a narrow neck of land sweeps round north-eastward and northward nearly a mile, and terminates in a peninsula, half a mile long, E.N.E. and W.S.W. between which and a small island to the northward of it, is the narrow and only entrance into the basin. This small island, and the rocks to the northward of it, are connected with the north part of the basin by a dry sandy flat, which lines its shores. A vessel may lie completely land-locked in Swan basin; but from the narrowness of its entrance and the confined space within, it can scarcely be called a port.

King River.—From the northern entrance point of Pine cove a narrow peninsula extends N.W. two-thirds of a mile to the southern point of the mouth of King river, which is one-third of a mile wide; but it is encumbered by two islets, from the outer and smaller of which a shoal extends at least one-third of a mile to the south westward, as there does also from the north-eastern entrance point of the river. King river takes its rise among the elevated hills to the eastward; but it is very little known.

The head of the northern arm of Macquarie harbour above King river and Swan basin, is formed by numerous points and bights, affording several sheltered anchorages, secure from all but south-east and southerly winds; but little appears to be known of this arm of Macquarie harbour above River point and Pine cove.

TIDE.—There is little or no set of tide in Pine cove, and its rise and fall does not usually exceed 1½ feet.

The South-western Shore of Macquarie harbour from Liberty point trends South 2½ miles, and E. by S. three-quarters of a mile to a projecting head, forming the north-west entrance point of Double cove.

Double Cove is one third of a mile wide at its entrance between two projecting points lying N.W. and S.E. from each other, within which it is little more than half a mile in extent, with only 6 to 3 feet water, and is much contracted by a projection near the middle of it, which renders the anchoring space very confined, even for the small vessels which are enabled to cross over the Bar at the harbour's mouth. Good shelter for boats may, however, be found here; and there are several runs of fresh water, crossing over the beach from the higher land behind.

From the south-east entrance point of Double cove the south-west shore of Macquarie harbour extends in an E.S.E. direction 4¾ miles, and then S.E. ½ E. 2 miles to the north-west entrance point of the southern arm of the harbour. It consists of rocky points and small bights, mostly fronted by sunken rocks, none of which appear to extend more than a quarter of a mile from the shore. The land behind the shore, from Double cove to the southern arm of the harbour, chiefly consists of yellow loam, and is thickly wooded.

Head Quarters Island.—Between the north-west entrance point of the southern arm of Macquarie harbour and the projection at 2 miles to the north-westward of it, the shore is fronted by a reef extending about a quarter of a mile from each point, and 1¼ miles from the shore midway between them. Head-quarters island, the central and largest of the islets and rocks on this reef, and which lies S.E. ¾ E. 8¼ miles from Liberty point, is half a mile long N.E. by N. and S.W. by S.; but is only one cable broad. It has dry and covered rocks close to each end, and there is a small islet on the spit of the reef E.N.E. 4 cables from the north-east point of head-quarters island. There is anchorage in 4 to 6 fathoms water in the bight of the reef about half a mile to the south-eastward of the island.*

Birch Inlet, the southern arm of Macquarie harbour, is 2 miles wide at its entrance, W.N.W. and E.S.E, whence it gradually narrows for about 2 miles to the south-westward, where it is only one-third of a mile wide, and after continuing this width nearly a mile to the southward, the channel opens into Birch inlet, a sheet of water above one mile wide, and extending 3 miles and probably more, in a south-east direction.

Gordon River flows into the south-eastern end of Macquarie harbour, between the south-eastern entrance point of the southern arm and another point at 1½ miles to the north-eastward of it. Both entrance points of the river have rocks projecting about one or 2 cables from them, between which is a bar with 12 feet water on its deepest part, upon the south-west side of the entrance of the river. Thence Gordon river trends S.E. 2 miles and after turning one mile to the north-eastward, it winds nearly 6 miles in an East direction, and then trends 4 miles southward of some marble cliffs on the west side, above which the river is formed by several streams flowing from the interior mountains. From 2 fathoms on the bar the depth of water increases to 10 fathoms 2½ miles within it, with navigable water for a vessel up to within half a mile of the falls.

The North-eastern Shore of Macquarie harbour from a small bight on the south-east side of Sophia point, trends S.E. by E. 4 miles, and thence South nearly a mile to Coal head; there is a small creek, or rivulet 1¾ miles from Sophia point. The land behind this shore, although bad, is thickly wooded.

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* On this island there was formerly a Government establishment for convicts who had been re-transported for crimes committed in the colony.

Between Coal head, and a projecting point S.E. 3¾ miles from it are two bights, the north-western and deeper one being filled by a shoal flat which extends three-quarters of a mile from the shore; but the south-eastern bight may be approached within a quarter of a mile of the shore in 2 to 4 fathoms. The land behind these bights is poor and heathy, rising inland to mount Sorell E. by N. ½ N. 7 miles from Coal head.

Phillip Isle, S.E. ½ S. between one and 1⅔ miles from Coal head, is about 2 cables broad, and situated on the edge of a rocky shoal, which extends about half a mile from the broad projection, which separates the two bights just noticed. A dry rock lies between the island and the shore.

Pine Point, E. by S. three-quarters of a mile from the south extreme of the south-eastern bight before mentioned, is the extremity of an irregular projection of the north-eastern shore, stretching out nearly a mile in a S.W. direction, and separating a kind of basin on its north-west side, from the north-eastern arm of Macquarie harbour. This basin is more than a mile in extent each way, with a small island in the centre; but its entrance has a reef stretching nearly half way across from the western side.

Kelly Basin is a sheet of water 1½ miles long, N.W. and S.E., and three-quarters of a mile wide, forming the head of the north-eastern arm of Macquarie harbour, which from its entrance between Pine point and the north-eastern entrance point of Gordon river, extends about 2½ miles in a N.E. direction to the entrance of this basin, which is only half a mile wide. Nothing is known of the depth or capabilities of this branch of the harbour, nor of the basin on the north-west side of Pine point.

INLAND LAKE and RIVERS.—To the north-eastward of Kelly basin are some high ridges of white-topped mountains, which are visible from the borders of the river Derwent. On the summit of these mountains an extraordinary lake was discovered, in 1817, by Mr. Beamont, and reported by him to be of an angular form, and upwards of 50 miles in circumference. It is supposed to be the source of Derwent, Gordon and Birch rivers, the latter two of which flow into the south-eastern part of Macquarie harbour.*

The Soundings in Macquarie harbour, between the spit off River point and the reef projecting from Head Quarters island, range from 13 to 20 fathoms in mid-channel, and from thence generally decrease to 10 and

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* Horsburgh's East India Directory, vol. ii., 8th ed., p. 720.

6 fathoms within half a mile of the shore on either side. From 8 fathoms at a mile south-eastward of Head Quarters island the depths decrease to 2 fathoms on the bar of Gordon river.

DIRECTIONS.—The north-west and westerly gales which frequently blow with great violence on the western coast of Tasmania, not only influence the tides in Macquarie harbour very considerably, but render it unsafe for any vessel to anchor outside the bar when there is a prospect of the wind blowing from those quarters, as there is no shelter between North and West, in the outer road, for any but small vessels. The best anchorage there in fine weather, to wait for the tide on the bar, is in 6 or 7 fathoms water, sandy bottom, with the northern extremity of cape Sorell bearing W. ¾ S., and the eastern foot of mount Wellington just in sight through the narrow channel on the west side of Entrance islet. In this situation the distance from the north-eastern foot of Watts hill will be nearly half a mile, and somewhat more than that from the nearest part of the bar.

To Cross the Bar.—The marks for crossing over the deepest part of the bar, in 9 feet, at low water, are the centre of Entrance islet in line with the eastern pitch of the summit of mount Wellington; and in proceeding in with these marks kept carefully in line, the depths will gradually decrease from 7 or 8 fathoms at three-quarters of a mile outside, to 9 feet on the bar, the latter depth continuing so for about 250 yards, when the small rock which lies close to the northward of Watts hill, will open out a little from the land, bearing W. by N. ¼ N. Then steer S.W. and keep the sea horizon in view between the rock and the land, until the east pitch of mount Wellington comes over the west end of Entrance islet; the vessel will then be just inside the bar, and may steer through the inner road for the islet, with these marks in line, in 10 feet to 8 fathoms water.

There is good anchorage in the inner road, between the Bar and Entrance islet, in 10 feet to 6 fathoms, clear sandy bottom, with the centre of mount Wellington over the west point of the narrow entrance; but the breadth between the breaking water on each side is, in some parts, only a quarter of a mile. In working through the inner road, the shoals on the east side should not be approached nearer than to bring the east pitch of the summit of mount Wellington over the west end of Entrance islet; nor the shoals on the west side nearer than to bring the centre of the narrow channel, on the west side of Entrance islet, in line with the inner extremity of Sandy point.

Great attention must be paid, not only to these marks and to obtaining quick soundings, but to the tide streams, which run here with great strength, and during freshets, have been experienced at the rate of 5 and 6 knots.

In sailing against the ebb through the proper channel into the harbour, which is between Entrance islet and the steep rocky head to the westward of it, keep the western shore aboard while passing the islet, as the tide stream sets strong out of a bight just within it, and is likely to drift a vessel upon the islet, if there be not a commanding breeze.

In proceeding up the channel from the Entrance islet to mount Wellington, Bushy islet and the rocks to the southward of it must be left on the starboard hand, and in passing between Bushy islet and Sandy point, borrow towards the former, to avoid a spit projecting from the eastern extensive sand-banks to within 250 yards north-eastward of the islet. Having passed Bushy islet and the rocks to the southward of it, the deep channel will be close round the foot of mount Wellington, and on its east side is about 330 yards wide, with 2 to 5 fathoms water. From this the depth increases to 7 and 8 fathoms on the south-east side of the mount, where the channel is contracted to little more than half the above width, and the stream runs with increased velocity.

After rounding mount Wellington, a vessel may proceed through Channel bay by the inshore passage, or by the middle channel; if the latter and more direct channel be preferred, steer for Round head, keeping the white mark half way up the hills southward of mount Wellington astern, bearing N.W. ½ W. until the north-west extreme of the head nearly shuts in the west end of a sandy beach in the southern part of Channel bay. Then steer E. by N. ½ N. so as to keep the end of the beach just in sight, bearing W. by S. ½ S., which will lead into the narrow western entrance of Kelly channel, between the drying sand-patch and the spit or bank to the south-eastward of it. As there are only 3 feet water on the latter, a vessel will ground on it if the whole of the beach be shut in behind Round head.

Where a beacon, or even a branch of a tree, erected on the south extreme of the drying sand-patch, it being kept exactly under the white mark on the hills southward of mount Wellington, bearing W. by N. ¾ N., would lead directly through the narrow part of Kelly channel, in 7 and 8 feet least water, which depth will oblige a vessel of greater draught either to wait for high water, or lighten sufficiently to enable her to run through.

When the centre of Betsey islet comes on with the western extreme of the flat summit of Table head, bearing S. by E, ½ E., the narrows of Kelly channel will be passed, and an E.N.E. course for 2 miles will take a vessel into 7 or 8 fathoms water, in line between the eastern extremes of the extensive sand-banks on either side, giving a berth of half a mile to the spit which projects from River point, with Table head bearing S.S.W., when a course may be steered up the harbour, or according to destination.

In steering the E.N.E. course here recommended, the lead must be hove quickly, as the banks on each side are very steep, and the water shoals from 40 to 3 feet in the space of a few yards, being deepest near the edge of the northern shoals.

Productions.—The land in the vicinity of Macquarie harbour and the rivers which flow into it is said to be wholly unfit for cultivation, but the forests abound with various kinds of timber, fit for spars, boat-building, joiners' and cabinet work, and architecture. The Adventure bay pine, which is fit for small spars and a variety of other purposes, grows about King river, and the south-eastern as well as the north-western parts of the harbour, it grows to the ordinary height of 40 or 50 feet, and is from 12 to 16 inches in diameter, with leaves resembling parsley. These spars are generally rafted over the bar, and taken on board in the outer road.

Supplies.—Fish may also be procured in plenty near the rocky parts of the shore, and fresh water in almost every part.

TIDES.—The ordinary time of high water, full and change, on the bar at the entrance of Macquarie harbour, is 7h. 30m.; springs rise 3 feet; but the time of high water and rise are both influenced by westerly and north-west gales, and by the great freshets that during the prevalence of rainy or thick cloudy weather, flow into the harbour from the high mountains in the interior, at which periods the channels between the shoals are deeper than usual. During Capt. P. P. King's stay of a fortnight in Macquarie harbour, the tides were found to be irregular, making high water sometimes twice, and at other times only once in 24 hours, and in both cases the ebb ran twice as long as the flood, producing a difference in the level of the water, which on several occasions did not exceed the average fall of 18 inches.

Mr. Kelly, commander of the brig *Sophia*, and the original discoverer of Macquarie harbour, in 1816, says he has experienced a constant outset or ebb for nine days together, without the water rising or falling so much as one foot, although at other times, during north-west gales, the inundations have been great, frequently overflowing the adjoining low lands to such an extent, that a large Huon Pine tree 16 inches in diameter, was left by the swollen waters on some sharp-pointed rocks on Entrance islet, at least 10 feet above the common level of the sea.

THE WEST COAST of Tasmania from cape Sorell extends S.S.E. ½ E. 26 miles, and then S.W. ½ W. 3½ miles to Hibbs point, and consists of a series of rocky bights and projections. For the first 12 miles from the cape the coast is fronted by rocky ledges and rocks above water, generally extending about 1½ miles from the shore. The land behind the whole of this coast rises by a gentle ascent, for 2 or 3 miles from the shore, and is apparently smooth and uniform, but destitute of wood and almost of other vegetation.

SLOOP ROCK, S. ½ E. 10½ miles from cape Sorell, is a small islet about 2½ miles from the shore, with some sunken rocks at 1½ miles to the northward, and others to the south-eastward of it.

HIBBS POINT and Pyramid Rock.—Hibbs point projects south-westward about 3 miles from the line of coast, and is higher than the neck by which it is joined to the back land. A remarkable pyramidal rock lies N.E. by N. nearly 2½ miles from Hibbs point, which rock may be seen, appearing like the crown of a hat, when bearing N.N.E. over the extremity of the point. A ledge of rocks projects about 1¼ miles from Hibbs point, and along the south side of the point, some of the rocks on the eastern part of the ledge being above water. There is a fresh-water pond near the shore, abreast of Pyramid rock, and at 1½ miles to the south-eastward of the pond, a small stream flows into the bight on the south side of Hibbs point.

Reported Anchorage.—From the small stream which flows into the bight on the south side of Hibbs point, the coast trends S.E. by S. 8½ miles to a headland projecting 1½ miles from the coast line; between this headland, and a cliffy peninsular head South of it extending 3 miles from the coast, is an inlet half a mile wide, said to afford anchorage for small vessels. A reef with a rock above water on it, extends from one mile south-westward to 1½ miles northward of the north head, and a larger reef, with high rocks on it, one mile off shore, projects S.W. 2½ miles from the cliffy peninsular head, which forms the south side of the reported anchorage.

Mainwaring Cove and Inlet.—The former is the bight formed on the south side of the cliffy peninsular head just noticed, and Mainwaring inlet, which has a reef projecting from each side of its entrance, lies S.E. by E. ½ E. 4½ miles from High rocks.

ROCKY POINT.—From Mainwaring inlet the coast curves slightly in a S.S.E. ½ E. direction for about 8 miles to Rocky point, from which reefs extend about 1½ miles to the south-westward and nearly a mile to the north-westward. The land between Hibbs and Rocky points is somewhat more elevated, and not so destitute of wood as that to the northward of Hibbs point; the summit of Junction range, 1,210 feet high, is situated N. ½ E., 8 miles from Rocky point.

Black Rock, N.W. 7 miles from Rocky point, and nearly 3 miles from the shore, is 20 feet high and surrounded by rocks and breakers, with another patch of rocks and breakers about 2 miles to the south-eastward of it.

Elliott Cove.—Between Rocky point and a rounding projection of the land S.E. ½ E. 14 miles from it, the coast forms a bay 5 miles deep, the head of which is Elliot cove.

From the rounding projection which forms the south-east extreme of the bay just noticed, the general trend of the coast is S.E. 8 miles to

St. Vincent point, between 2 and 3 miles to the north-westward of which is a small bight having two islets or rocks one mile off its entrance; they lie close together and are connected by a reef.

Aspect.—The coast for about 18 miles to the south-eastward of Rocky point is high, and at the back are several bare white peaks, as if covered with snow; De Witt range, 2,445 feet high, the most elevated of these peaks, is situated S.E. by E. ¾ E. 17½ miles from Rocky point.

ST. VINCENT POINT, North Head, and Dock Islet.—St. Vincent point and North head, at 2 miles to the south-eastward of it, are each fronted by a reef with dry rocks on it. Dock islet lies about one mile off the bight between the point and the head, and there is a detached reef about half a mile to the southward of North head.

POLLARD HEAD.—From North head the coast trends nearly E. ½ S. 1¼ miles to Pollard head, the north-western entrance point of port Davey: there are some sunken rocks close to Pollard head; but there is a depth of 5 fathoms one cable off it.

PORT DAVEY.—When nearing this port the land on either side presents a most rugged and barren aspect, and is steep and mountainous towards the East. The entrance, which is easily known by the high Pyramidal rock three-quarters of a mile to the north-westward of Hilliard head, is 3¾ miles wide from Pollard head S.E. ½ E. to Hilliard head; it has a bold approach, and is easy of access, the chief danger to be avoided being a sunken rock, said by Captain Stokes, to lie nearly midway between Pollard head and Pyramidal rock. The soundings across the entrance gradually increase from 5 fathoms at a cable off Pollard head to 27 fathoms near Stokes' reported sunken rock, and from thence decrease to 9 fathoms close to Pyramidal rock.*

Port Davey extends 10 miles from its south-eastern to its north-western extreme, and has several branches; that which affords the most secure anchorages being apparently on the east side, which includes Bramble cove and Bathurst harbour.

HILLIARD HEAD is a high craggy projecting point, with some sunken rocks close to it, and a group of islets and rocks south-eastward of it.

Chatfield and Stephens Islets, the former are five in number, some of which are high and peaked, with sunken rocks about them, lying within one mile to the south-eastward of Hilliard head; there are also some sunken rocks between Chatfield islets, and Stephens islet which lies E.S.E. 1½ miles from the head, and close to the shore. From 3 to 4 miles from

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* *See* Admiralty plan of port Davey, No. 2,130; scale, m = 2 inches.

Hilliard head, between the bearings of S.S.E. and S. ½ W. are several islets and rocks of which the most remarkable is Sugarloaf rock.

South-Eastern Shore of Port Davey.—From Hilliard head to Forbes point, N.E. by N. one mile from it, the shore forms a bay, between which and Pyramidal rock is Swainson islet, with some sunken rocks close round it and a dry rock near its north-western extreme. There are 7 to 10 fathoms water between Hilliard head and Swainson islet, and 5 to 15 fathoms between the head and Pyramidal rock.

On the east side of Forbes point is Norman cove, about one-third of a mile in extent, having 4 and 5 fathoms water in it, from the east side of which the shore sweeps round a quarter of a mile to Knapp point, close off which is Hay islet, lying N.E. ½ N. two-thirds of a mile from Forbes point.

Hannant Point, which lies in line with Hay islet near Knapp point and Forbes point, is a narrow projection separating Spain bay on the south-west side, from Hannant inlet on the north-east side of the point. Spain bay has 8 to 11 fathoms across its entrance, close within which there is a sunken rock. This bay, which runs in about three-quarters of a mile from its entrance, appears not to have been sounded inside the sunken rock.

Hannant Inlet.—The entrance of this inlet is barely a quarter of a mile wide, between Hannant point and O'Brien point to the northward of it, and is nearly barred across by a narrow islet extending above a quarter of a mile N.E. and S.W. close within the entrance. Thence the inlet runs nearly 3 miles to the southward, but has not been minutely surveyed.

Nares Rock, lying N.E. by N. 1½ miles from Pyramidal rock, is a sunken patch, with 2 to 5 fathoms water round it. There are more than 17 fathoms water between Swainson isle and Nares rock, and 18 to 7 fathoms between the rock and the cove to the eastward of Forbes point.

Shanks Islets, eight in number, lie in line with Pyramidal and Nares rocks, and W. by N. one mile from Hannant point. These islets, which extend 4 cables, North and South, have sunken rocks close about them, but there is a clear channel, with 6 to 18 fathoms water, between the shore about Knapp point and a line from Nares rocks to Shanks isles, and 12 to 7 fathoms from Spain bay to 2 cables eastward of Shanks isles.

The Eastern Shore of port Davey, from O'Brien point, trends nearly N.N.W. ½ W. 1½ miles to Turnbull head, which forms the south-east side of the entrance of Bramble cove. There are 8 to 10 fathoms water a cable off shore, except at a third of a mile southward of Turnbull head, where a rocky ledge projects nearly a cable from the shore.

BREAKSEA ISLES extend from half a mile N.N.W. of the northernmost Shanks islet to three-quarters of a mile W. ¼ N. of Turnbull head. They are two in number, the southern and longer island being three-quarters of a mile long; but neither of them exceeds 300 yards in width. There is a dry rock near the south end of the southern island, and the shores of both have sunken rocks close along them; but there are 13 to 9 fathoms water within a cable of their west sides, and 4 to 6 fathoms at the same distance from their eastern sides, between which and the shore there are regular depths of 6 to 8 fathoms.

South Passage, the channel between Shanks and Breaksea islets is nearly half a mile wide, with 16 to 10 fathoms water; and there are 14 to 6 fathoms from the middle of the passage to within a cable of the ledge of rocks to the southward of Turnbull head.

North Passage, between Breaksea isles and a rocky patch which shows itself a few feet above water, to the N.N.W. of it, is one-third of a mile wide, with 10 fathoms water, and 7 to 8 fathoms between the passage and the entrance of Bramble cove.

BRAMBLE COVE is a safe and commodious harbour, having an entrance 3 cables wide, with 4 to 14 fathoms water, between Turnbull head and Milner head, one-third of a mile to the north-westward of it. There is a dry rock close to Turnbull head, and a sunken rock lies close to Milner head. Within the entrance, Bramble cove forms a basin extending one mile East and West and three-quarters of a mile North and South, with regular soundings, decreasing from 14 fathoms in the entrance to about 4 fathoms off the shores, except to the eastward of Turnbull head, where there are 10 to 15 fathoms.

There is a rock above water with some sunken rocks, close to the eastern shore; and on the south side is Sarah isle, which, though little more than 2 cables in extent, greatly contracts the entrance from Bramble cove into Bathurst harbour, through an opening between 3 and 6 cables eastward of Turnbull head, the east side of the opening being Hixson point.

Bathurst Harbour.—The entrance into Bathurst harbour from Bramble cove is one cable wide, with 9 to 16 fathoms, between a projection at a quarter of a mile eastward of Turnbull head and the south-west extreme of Sarah isle. There is also a very narrow passage with 2½ fathoms water, between the south-east point of Sarah isle and Hixson point.

From its entrance, Bathurst harbour trends eastward nearly one mile to Mundy isle, and for the first half mile it is a quarter of a mile wide, with 7 to 14 fathoms water in mid-channel; but from thence to Mundy isle the harbour is nearly half a mile wide, with 14 to 7 fathoms both in mid-channel and at a cable from the southern shore.

Mundy Isle, which is about a quarter of a mile long, lies midway between projections of the northern and southern shores leaving a channel one cable wide, with 9 to 15 fathoms, between the south-west end of Mundy isle and the projection of the southern shore, and a 3-fathoms channel between the north-east end of the island and the point which projects from the northern shore.

From Mundy isle Bathurst harbour trends one mile eastward, with an average width of two-thirds of a mile, and regular soundings, decreasing from 11 fathoms in the centre to 5 and 4 fathoms a cable from either shore. The only objects worth notice on either side are Deep point, N.E. by E. one-third of a mile from the north-east end of Mundy isle, and Noon point, S.S.E. ½ E. nearly two-thirds of a mile from Deep point; a small islet near the shore, lies a quarter of a mile to the westward of Noon point.

At a mile above Mundy isle, Bathurst harbour is only a quarter of a mile wide, but it increases to two-thirds of a mile in width at three-quarters of a mile farther to the eastward, with 3 and 4 fathoms water a cable from the southern shore, and 4 to 6 fathoms within 2 cables of the northern shore; but the middle of the channel has not been sounded.

Spring River.—At N.E. by E. 1⅓ miles from Noon point is an islet which lies close off the mouth of Spring river, a stream flowing into Bathurst harbour from the northward; between this islet and an opening in the south shore, half a mile to the southward of it, there are 5 to 11 fathoms.

From the mouth of Spring river Bathurst harbour becomes a narrow channel, winding about 4 miles in an easterly direction, when it opens into an extensive sheet of water, forming the head of the harbour. It has a cluster of small islets in its south-west corner, and a narrow branch extending above 4 miles to the southward.

Kathleen Isle.—From Milner head to Ashley head, N.W. by W. ¼ W. 2 miles from it, the north-eastern shore of port Davey forms a bay, fronted by Kathleen isle, which lies equidistant from the two heads and about half a mile from the shore. There is a cluster of islets and sunken rocks between the north extreme of the island and the shore; and between Kathleen isle and the rocky patch to the southward of it is a channel 2 cables wide, with 5 to 10 fathoms water.

Ashley Head, and Bluff Head two-thirds of a mile to the north-westward of Ashley head, are each bordered by a rocky ledge; but may be approached within a cable in 6 and 5 fathoms water.

Pym Point.—From Bluff head the shore curves northward nearly 1¼ miles to Pym point; it is intersected nearly midway by an inlet, close off which are three small islets, with some sunken rocks.

The Western Shore of port Davey from Pollard head curves in a N.N.E. ¾ E. direction 1½ miles to Garden point, and thence forms another curve extending N.N.W. ¾ W. 2 miles to Earle point. Between Garden and Earle points the shore is lined with rocks, and a shoal with sunken rocks extends a quarter of a mile to the northward and eastward from Earle point.

Whaler Cove is a slight indentation of the coast between Garden point and a small islet near the shore one mile to the north-westward of it. From this islet a rocky reef extends about half way to Garden point, and nearly 2 cables from the shore. There are 4 to 7 fathoms water within 2 cables of the shore in the south-east part of the cove, where vessels may find tolerably sheltered anchorage in north-west or west gales; but it is exposed to the wind and sea, if blowing hard from the S.W.

Bond Bay extends from Earle point N.N.W. ½ W. 1⅔ miles to Curtis point, and is 1¼ miles deep; but nearly the whole bay is occupied by a flat having rarely more than 8 feet water on it, except in the entrance, where there are 2 to 2¾ fathoms, between half a mile N.N.W. of Earle point and a quarter of a mile south-eastward of Curtis point.

Kelly Basin.—In the bight of Bond bay, at 1¼ miles westward of Earle point, is an opening about 300 yards wide, having 9 to 12 feet water, which leads into Kelly basin, a circular sheet of water 1¼ miles in diameter; it is filled by a shoal flat, except for about three-quarters of a mile to the south-westward from its entrance, where there are 12 to 6 feet water.

Payne Bay, the northern part of port Davey is little more than 2 miles wide, East and West, at its entrance between Pym and Curtis points, whence the bay extends 1⅔ miles to the northward. The eastern shore of Payne bay from Pym point trends N.N.W. ½ W. one mile to Woody point. Two small islets, with sunken rocks about them, lie N.W. one third of a mile from Pym point, nearly 2 cables from the shore; and from Woody point three similar islets, with sunken rocks, extend nearly 2 cables.

Between Woody point and Fitzroy point, W. by N. ¾ N. 1¾ miles from it, the northern shore of Payne bay forms a bight, having two small islets near the shore, half a mile north westward of Woody point, and another islet three-quarters of a mile to the eastward of Fitzroy point, the shore being mostly lined with sunken rocks. Fitzroy islets, which are four in number, with sunken rocks about them, extend one-third of a mile southward and a quarter of a mile south-westward from Fitzroy point.

Stephen River.—Above Payne bay the northernmost part of port Davey, from the width of nearly 1¼ miles between Curtis and Fitzroy points, contracts to a quarter of a mile across, at the mouth of Stephen river, which flows from the northward into the head of the port, W. ¾ N. 1¾ miles from Fitzroy point. Sunken rocks lie close along the northern shore, and others extend about a quarter of a mile from the bights on either side of Observatory point, which lies 1½ miles to the north-westward of Curtis point.

The northernmost part of port Davey is filled by a shoal flat, having generally 6 to 8 feet water on it, the 12-feet edge of which from a quarter of a mile off Curtis point, trends N.W. by N. to about half a mile westward of Fitzroy point. At half a mile to the northward of Observatory point a ridge, with 3 to 4 feet water on it, stretches East and West nearly across from shore to shore.

Soundings.—From 25 fathoms midway between Pyramidal rock and Garden point, the soundings gradually decrease to 12 fathoms within a cable of the rock, and to 9 fathoms a quarter of a mile from Garden point. From 5 fathoms close to Nares rock, the soundings increase to 23 fathoms 1½ miles in a N.W. by N. direction, and thence decrease to 10 fathoms at one mile E.N.E. of Garden point. From a line between this point and Kathleen isle, where the depths increase regularly from 4 to 10 fathoms, the soundings up the harbour to Payne bay, decrease regularly to 4 fathoms. The shores on either side of the harbour, as far up as Earle point and Bluff head, may be generally approached within half a mile in 5 and 6 fathoms; but off Earle point, on the west side, and between Bluff head and Woody points, on the eastern side, there are only 3 and 4 fathoms at that distance from the shore.

DIRECTIONS.—With the assistance of the Admiralty plan, there will be no difficulty in entering port Davey, by passing between Pollard head and the Pyramidal rock, taking care to avoid the sunken rock reported by Captain Stokes to lie nearly mid-channel. In entering from the southward a good offing must be kept until Pyramidal rock bears N.E., to clear the high-peaked Chatfield islets.

For Whaler Cove.—In the event of being obliged to run into port Davey through stress of weather, when blowing from N.W. or West, a vessel having cleared Pollard head and the reported sunken rock to the south-eastward of it, may haul round Garden point and anchor in 5 to 7 fathoms, in Whaler cove; but should the wind be from, or shift to the S.W., this anchorage would be unsafe, being exposed when the wind and sea are from that quarter.

In Working into port Davey, the western shore between Pollard head and Garden point may be safely approached until the water shoals to 8 fathoms; but in standing towards the south-eastern shore, care must be taken to tack in time to avoid Nares rock.

For Bramble Cove.—If it be desirable to shift from Whaler cove to Bramble cove or Bathurst harbour, and the wind be not to the southward of S.W., run across for the North passage, by steering for the north extreme of Breaksea isles; pass between them and the rocky patch to the northward and then into Bramble cove, which is easy of access either from the North or South passage; both sides of the cove are bold, and may be approached within a cable in 4 fathoms, and the entrance is well protected by Breaksea isles, from the heavy sea which rolls into port Davey. Bramble cove, or Bathurst harbour within it, is perfectly secure in the most boisterous weather, and will afford convenient and safe anchorage when necessitated to leave Whaler cove.

For Bathurst Harbour.—As the Admiralty plan will be a sufficient guide for entering Bathurst harbour from Bramble cove, it will be here only necessary to state that the proper channel is between Turnbull head and Sarah isle.

For Bond Bay.—If compelled by southerly gales to leave Whaler cove and a vessel be unable to fetch Bramble cove, she should run up to the northward for Bond bay, taking care not to shoal the water to less than 3½ fathoms, and to give Earle point a good berth, to avoid the sunken rocks which project to the eastward and northward from it. Having passed Earle point, and brought Bluff head to bear E. by S. haul into Bond bay till the peak of Pyramidal rock is just shut in with, and visible over Garden point, bearing S.S.E. ½ E., and anchor in 3½ to 3 fathoms, half a mile off the north extreme of Earle point. Small vessels might run further up the bay, and anchor in 3 to 2½ fathoms, and be more sheltered from the sea that runs up the port.

For Bramble Cove from the Southward.—A vessel bound into Bramble cove from the southward, after rounding Pyramidal rock may steer N.E. by N. for the South passage, and having passed between Shanks and Breaksea isles, enter Bramble cove as directed when proceeding from Whaler cove.

Working out from Bramble Cove.—If the wind be from the northward or N.W., the South passage between Breaksea and Shanks isles would be the most practicable; but if from the westward or S.W., the North passage is the more safe and convenient one for going out, leaving the rocky patch on the north side of that passage, on the starboard hand, and giving it a good berth. If necessary to tack when in this passage, a vessel should not stand within 2 cables of the rocky patch, or of the Breaksea isles, as the heavy swell which sets in may cause her to miss stays; then, if not nearer than that distance, there will be sufficient space to bear up and go to leeward of either the rocky patch or the islands, where there will be from 8 to 10 fathoms water within 50 to 100 yards of either, and ample room to get the vessel again under command.

TIDES.—From what was observed during 10 days' stay in port Davey, there appeared to be no uniform motion in the tides, neither in their ebbing nor flowing, nor in their rise. It seems, however, that they are greatly influenced by the force and direction of the winds, for previously to a strong westerly breeze, the water rose from 4 to 5 feet, and ebbed but 2 feet. When the fine weather returned, 2 feet appeared to be the extent of the rise, and this was about the time when the moon changed.

The COAST from 1¼ miles eastward of Hilliard, or S.E. head trends S.S.E. ¼ E. 11 miles to the South-west cape of Tasmania; the land is mountainous and presents a barren and desolate appearance.

CHAPTER VII.

TASMANIA.—SOUTH AND EAST COASTS.

VARIATION in 1884.

South cape - - 9° 25′ E. | Eddystone point - - 9° 40′ E.

SOUTH-WEST CAPE is bold and remarkable, with a sharp and rugged outline. Approaching it from the westward, no danger is to be apprehended; but in coming from the eastward and bound round it, as the prevailing winds are from the westward, it is necessary to keep a good offing, for the long westerly swell, which rolls in with great force, in conjunction with the current, which generally sets down the coast and towards the cape, throws a vessel very fast to leeward.*

The SOUTH COAST of Tasmania extends from South-west cape, nearly East, 36 miles to South cape, and, as might be concluded from its exposed situation to the storms of the Polar regions, is rugged, abrupt, and barren, with some small islands lying from 3 to 12 miles off it. The projecting heads of land are supported by basaltic columns, like the Giant's Causeway in Ireland, and it is without any known places of shelter from onshore winds, although it contains two or three sandy bays.

Between two steep rocky heads bearing E.N.E., distant 3½ and 7 miles from South-west cape, is a sandy bay, divided into two bights by a rocky point, with two clumps of rocks in the entrance.

Cox Bight.—From the eastern point of the sandy bay just described, to the north-west point of Louisa bay, E. by N. ½ N. 6½ miles from it, is an indentation of which the western corner forms Cox bight, a deep sandy, but exposed bay. From Cox bight to Louisa bay the coast rises to Bathurst range, which attains an elevation of 2,626 feet.

Louisa Bay and High Bluff.—Louisa bay extends about one mile from N.W. to S.E., and has an islet in its entrance. From the south-east point of the bay the coast trends E.S.E. 3 miles to High bluff, the appearance of which may be inferred from its name.

MAATSUYKER ISLES.—Needle rock.—Maatsuyker isles consist of two large and several smaller isles lying between 3 and 9 miles off High bluff; the outer and larger of the two principal isles, which lies E. by S. ½ S. 13 miles from South-west cape, has a reef projecting to the south-westward, on which is the Needle rock. There are several islets and rocks on a reef which extends to the northward from the island. The inner Maatsuyker isle is 1,160 feet high, and lies midway between the outer isle and High bluff. There is a sunken rock midway between Louisa bay and the inner isle, and S.S.E. 2½ miles from the latter is a cluster of rocks, the highest having an elevation of 540 feet, above water.

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* *See* Admiralty chart, Tasmania, with approaches to Derwent river and Hobart No. 1,079; scale, *m* = 0·11 of an inch.

MEWSTONE, S.E. 6½ miles from the outer Maatsuyker isle, is a cliffy islet 410 feet high, and in form resembles a lion's head; there are rocks close to the eastward and westward of it.

Soundings.—There are 61 to 45 fathoms between Maatsuyker isles and Mewstone; but vessels are recommended to pass to the southward of Mewstone, S.W. 6 miles from which there are 85 fathoms, coral and fine brown sand.

The COAST from High bluff trends N.E. 7 miles to an inlet, and thence extends S.E. ½ E. 12 miles to the west entrance point of South Cape bay, 2 miles to the north-westward of which is Fluted point. Two rocks above water, lie close off a cliffy point 3 miles to the south-eastward of the inlet just noticed, and S.S.W. 2½ miles from the outer of these two rocks is isle du Golfe; there is also a small islet, or rock near the shore 2 miles to the north-westward of Fluted point.

LA PEROUSE.—From 3 miles south-eastward of the inlet just noticed, to South Cape bay the coast mostly consists of high cliffs, from which the land rises to a lofty range, La Perouse, 3,800 feet high, is situated North 8 miles from the west entrance point of South Cape bay. From La Perouse one ridge trends to the north-westward, and the main range 25 miles to the northward, the most elevated summit being Adamson peak, 4,017 feet high, which bears N. by E., distant 9½ miles from La Perouse.

South Cape Bay extends East 5 miles across from its west entrance point to Three Hillock point, and is 3 miles deep; but it is too open and exposed to deserve farther notice. There are some ponds of fresh water behind the eastern bight of the bay, 1½ miles to the northward of Three Hillock point.

SOUTH CAPE.—Three Hillock point forming the south-west extremity of South cape is a broad projection terminating eastward at Whale head, which lies E.N.E. 2 miles from Three Hillock point. Two miles to the northward of South cape the land rises to Bare hill, which is 909 feet high.*

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* *See* Admiralty chart:—Approaches to Derwent river and Hobart on chart of Tasmania, No. 1,079; scale, m = 0·11 of an inch.

Soundings.—From a depth of 45 fathoms rocky bottom, at 4½ miles north-eastward of the Mewstone to 2 miles south-westward of South cape there is no bottom at 40 fathoms.

PEDRA BLANCA and EDDYSTONE, S.E. by S. and S.E. ½ S. 14 miles from Three Hillock point, are 2 cliffy islets connected by a rocky reef, and lying N.E. by E. ½ E. and S.W. by W. ½ W. 1½ miles from each other; the former, which is the Swilly of Furneaux, is like Pedra Blanca near the coast of China, and the Eddystone resembles an ill-shaped tower.

SIDMOUTH ROCK, N.E. ¾ N. 5 miles from Eddystone islet, is about 100 yards in diameter and is above water, with a reef projecting about half a mile to the north-eastward. There is no bottom at depths of 20 fathoms close round this danger, and the passage between it and the Eddystone appeared safe.

The channel between these islets and South cape is 12 miles wide; and near the middle 60 fathoms water have been found, on broken coral and shells.

Rurick Rock is said to have been seen by the Russian ship *Rurick*, in 1822, and to lie nearly E. ½ S. 33 miles from Pedra Blanca, or in lat. 44° S., long. 147° 44′ E. This rock is reported to have been seen by the ship *Pericles* in 1878.

H.M.S. *Clio*, in 1872, passed between 4 and 5 miles to the westward of the supposed position of Rurick rock, without seeing any indication of it.

D'ENTRECASTEAUX CHANNEL is a smooth-water passage between the south-east coast of Tasmania and Bruny island, leading from the south-westward to the Derwent river and Hobart the capital of Tasmania. The southern entrance of this channel extends from South cape nearly N.E. by E. 20 miles to Tasman head, the south point of Bruny island, with soundings in 60 to 50 fathoms for about two-thirds of the distance across from the cape. The channel, about 35 miles long, is slightly winding, the general direction being S. by W. ½ W. and N. by E. ½ E.; but its width is irregular, varying from 4 miles within the southern entrance, to little more than half a mile in the northern entrance, the depths ranging from 40 to 5 fathoms in the fairway.

The western coast of D'Entrecasteaux channel from Whale head, trends nearly N.N.E. ¾ E. 3½ miles to a rocky projection, on the north side of which is a landing-place; this coast may be approached within a quarter of a mile in 19 to 4 fathoms. From the landing-place a rocky indentation, with deep water near the shore, trends N. ½ W. three-quarters of a mile to First Look-out, and thence a rocky, but bold shore extends N.N.W. ½ W.

three-quarters of a mile to Arthur point, the southern entrance head of Recherche bay.*

RECHERCHE BAY.—The entrance of this bay extends from Arthur point N. by W. ¼ W. 1½ miles to Sullivan point, from which Image rocks extend about half a mile to the eastward. Some of these rocks are even with the water's edge and others are more elevated.

Sunken Reef.—At 1¼ miles E. by S. ¼ S. from the northern entrance head of Recherche bay is Sunken reef, upon which the sea breaks but little in moderate weather, and the soundings decrease suddenly from deep water to 3 fathoms close to the reef. There are 20 to 16 fathoms between Arthur point and Sunken reef, and 16 fathoms between it and Image rocks; but at 3 cables north-eastward of the reef there are only 3 fathoms water.

Southern Arm.—Recherche bay does not extend more than a mile to the westward from its entrance, but it has two arms, forming very secure anchorages; one trending to the south-westward, and the other to the northward. The entrance of the southern arm, or Rocky bay, nearly two-thirds of mile wide lies between Arthur point and Fishery point, a projection of the western shore, which is situated N.W. by W. one mile from it; the entrance is divided into two channels by Mutton rocks, a small cluster of dry and covered rocks; the west channel, although having a depth of 3 fathoms, is so choked with weed, that it is with difficulty a boat can pass. The east channel has depths of 5 to 4 fathoms. From its entrance the southern arm extends 1½ miles in a S.W. direction to Cockle creek, and has 6 to 2¾ and 5 fathoms water, affording secure anchorage, on fine sand, in any depth suited to a vessel's draught.

The shores round the southern arm are covered with thick wood, rising to a considerable height, and there are two or three rocks above water at its southern extremity.

Water.—Fresh water may be obtained at a little cove of the western shore.

Northern Arm.—From Fishery point the western shore of Recherche bay trends North half a mile, and then curves round north-westward three-quarters of a mile to Catamaran river, which is one cable wide, with 6 feet water in the entrance. From this river the western shore curves northward and north-eastward nearly one mile to the western entrance point of the northern arm, or, as it has been named, the Pig-sties; from this point a ledge of rocks projects 2 cables to the southward, of which the southernmost is Gull rock. The western shore is closely bordered with rocks, immediately outside which there are 3 fathoms water, with 5¾ fathoms in the centre of the bay, between its western shore and Sullivan point, and 12 fathoms a little farther out. Near the northern part of the bay there is a bank of weed.

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* The scenery of D'Entrecasteaux channel is very fine, high hills well wooded, with picturesque dwellings scattered along their sides., A steam vessel runs every week from Hobart.—Lieutenant J. St. C. Bower, H.M.S. *Danäe*, February 1879.

From Sullivan point the shore, which is bordered by rocks above water, trends W.N.W. three-quarters of a mile to a small point of remarkable rocks close to Observatory point, which forms the east side of the entrance of the northern arm of the bay.

The entrance, one-third of a mile wide, is divided into two channels by Shag rock, a small rock above water, betwen which and the east point there are 5 to 6½ fathoms in mid-channel, with 2 fathoms near Shag rock, and 2 fathoms near the east point; this channel, although narrow, is easily distinguished. From the entrance the northern arm extends nearly 1¼ miles northward to D'Entrecasteaux river, and is two-thirds of a mile wide, with depths of 5, 4, and 3 fathoms up to three-quarters of a mile above the entrance.

The sloping shores of this excellent harbour are covered with thick wood, and the water is so smooth that it is scarcely agitated with the most violent winds. Its general depth is about 3½ fathoms, with black muddy bottom, in which the anchors bury themselves, and vessels may ground without danger.

DIRECTIONS.—In entering the northern arm from the south-eastward, steer towards Shag rock, until abreast of, and close to the small point of remarkable rocks, and leave on the starboard hand a mass of weed connected with the rocks at the bottom, having in the centre only 2½ fathoms water. In passing Observatory point keep it open on the starboard bow, taking care not to go so far to the westward of it as to open Shag rock outside the southernmost point of land.

Water may be obtained on the western shore of the northern arm of Recherche bay.

ACTÆON ISLES and SHOALS, which lie about 3 miles off Recherche bay, are two small isles with numerous rocks and reefs, extending from them.

Sterile Isle.—Sterile isle the southern of the Actæon isles, lies N.E. by E. ¼ E. 3½ miles from Arthur point, and is about 2 cables in extent, with dry and covered rocks close to the eastward and westward of it, and a reef extending from it a quarter of a mile to the north-westward and 1¼ miles in a S.S.E. direction, with 10 to 13 fathoms within a quarter of a mile of its eastern shore.

South East Break, which is the southern part of the reef, extending from Sterile isle, has sunken patches on it at three-quarters of a mile from the isle. The *Wallace* was wrecked on one of these patches, upon which the sea does not always break.

South Break, E. ¼ N. 3 miles from Arthur point, is about a quarter of a mile in extent with 6 to 20 fathoms close to the south-west and westward of it, and a passage a quarter of a mile wide, between it and S.E. Break, through which no stranger should attempt to pass. The water shoals suddenly from 8, 7, and 6 fathoms to the reefs, on which there are 2 to 3 fathoms; and in heavy weather the sea breaks in 8 fathoms.

The Northern Actæon Isle, which lies N. ¼ W. between one and 1¾ miles from Sterile isle, is nearly divided into three by two narrow necks, the northern being dry at low water, and the other neck always dry.

A rock lies close to the north point of the northern Actæon isle; whence a reef projects nearly 2 cables to the northward. Some rocks also above water, lie 2 cables south-westward of the south point of the isle; and about the same distance to the eastward of the point is a patch, on which the *Actæon* was wrecked. From the south end of this isle a reef extends three-quarters of a mile to the southward, leaving between it and Sterile islet a passage a quarter of a mile wide, with depths of 4½ to 7 fathoms.

Deep Water Bank, the easternmost of the Actæon shoals, is a small patch lying N.E. by E. ½ E. one mile from Sterile islet, with 8 to 10 fathoms water close round it.

Black Reef, which lies nearly in line between the northern Actæon isle and Arthur point, distant 1¼ miles from the former, is a cluster of rocks a few feet above water, and about a quarter of a mile in extent. This reef is surrounded by deep water, suddenly shoaling to 3 fathoms close to it; there are 8 fathoms between Black reef and the shore to the north-westward, and 12 to 15 fathoms between the reef and the northern Actæon isle.

With the exception of the shoals which have been enumerated, the space between Recherche bay and the Actæon group, appears quite free from dangers, with generally about 8 or 10 to 20 fathoms water.

From Sullivan point a low shore—behind which is Black Swan lagoon—trends N.E. ¾ N. 1¼ miles to a more elevated coast, which turns half a mile south-eastward to Eliza point, close off which are Eliza sunken rocks.

South Port Lagoon.—From Eliza point a rocky coast sweeps round in a northerly direction 1½ miles to a narrow tongue of land, extending N.N.E. nearly 2 miles to the entrance of South Port lagoon, which is little more than one cable wide, and has generally a heavy surf across it; but within the entrance the lagoon is 3 miles long, from S. by W. ½ W. to N. by E. ½ E., and is nearly 1½ miles wide; the greater portion of it being separated from the sea by the narrow tongue of land just mentioned.

George III. Rock, upon which a vessel of that name was wrecked, is a small patch with 8 feet water on it, nearly midway between the northern-most Actæon isle and the entrance of South Port lagoon, and N.N.E. ¾ E. 2 miles from Eliza point. The sea seldom breaks upon this rock except in heavy weather; and in moderate weather, only at intervals of some hours; its position is sometimes shown by a heavy swell passing over it without breaking. With this exception there appears to be a clear channel, with 10 to 7 fathoms water, between the Actæon group and the coast from Eliza point to the entrance of South Port lagoon.

South Port Bluff, Blanche Rock, and South Port Isle.—From the north-eastern entrance point of South Port lagoon the coast curves 1¼ miles in a N.E. by E. direction to South Port bluff, one-third of a mile south-eastward of which is Blanche rock, above water, and situated on the north-western edge of a reef, about one-third of a mile in diameter. South Port isle lies one third of a mile north-eastward of the bluff, on the northern part of a reef of rocks about half a mile in extent.

SOUTH PORT.—From South Port bluff the coast trends N.N.W. nearly one mile to a rocky point, with a rock close off it, half a mile to the north-westward of which, is a projection with 3 fathoms water close to, forming the south-western side of the entrance of South port, whence the entrance extends across N.N.E. 1½ miles to Rossel point, close off which is a rock above water, with 9 fathoms water within a cable of it.

From the entrance, South port extends 2 miles in a W.N.W. direction, the depth of water decreasing from 17 fathoms in the middle of the entrance to 14, 9, and 3¾ fathoms within a quarter of a mile of the western shore. The south-western shore of the port is fronted by a shoal projecting two-thirds of a mile to the eastward, on which is situated Pelican islet, 1¼ miles north-westward of the south-western entrance point. There are 4 and 5 fathoms, on fine grey sand, in a small bight formed in the shoal on the south side of Pelican islet. At half a mile westward of the islet is a narrow opening communicating with a shallow muddy inlet, forming three branches and trending about 2½ miles to the north-westward.

Hythe.—The north shore of South port, which forms the water frontage of Hythe, consists of alternate bays and points, with fine slate near the shore, about three-quarters of a mile northward of Pelican islet. The township is in the north-west part of the bay. There is a telegraph station here connected with Hobart.

Anchorage.—H.M.S. *Danäe* found good anchorage in 11 fathoms water.

Burnett Point.—Sisters and Lady Bays.—From Rossel point the coast trends N.E. by N. three-quarters of a mile to Burnett point whence Sisters bay extends N. ¾ W. 1½ miles, and is two-thirds of a mile deep; but its inner part, and the shore between it and Burnett point, are bordered by dry and covered rocks. Between the northern extreme of Sisters bay and a rocky projection N. ¾ E. 1½ miles from it, are Lady bay and a smaller bight to the northward. Lady bay has some rocks near the shore, and a small stream flowing into it. From the bight northward of Lady bay the coast extends N. by E. ¼ E. 2 miles to Scott point, this point having at a quarter of a mile to the northward, a small patch, on which the *Katherine Shearer* was wrecked. This coast is bordered by reefs extending 3 to 2 cables from the shore, but there are 10 to 7 fathoms water at half a mile from the shore, between Burnett and Scott points.

PORT L'ESPERANCE.—From Scott point the coast sweeps round north-westward two-thirds of a mile to a projection between which and l'Esperance point, N. by E. ½ E. a little more than one mile from it, is the entrance of port l'Esperance, which extends thence 2¾ miles in a W. by N. direction, and is 1¾ miles wide. Hope isle, which is nearly half a mile in extent and covered with trees, lies one mile within the entrance, dividing it into two channels, that on the south side of the island being one-third of a mile wide, with 15 to 25 fathoms, over mud and sand, where a vessel may be sheltered from all winds.

About a mile to the westward of Hope isle, a point of the southern shore projects to the northward, on the west side of which is the entrance of an inlet one-third of a mile wide, with 8 fathoms in mid-channel, and 8 and 9 fathoms between it and Hope isle. From its entrance the inlet winds about 1¾ miles in a W.N.W. direction to a point which divides it into two branches, one trending half a mile to the southward, and the other about the same distance westward to l'Esperance river. One-third of a mile within the entrance of this inlet is Rabbit islet, between which and the western entrance point there is a narrow passage, with 4½ to 2½ fathoms, and 3½ fathoms water within the islet, above which the channel appears to be obstructed by small islets or rocks. A vessel may lie in this inlet perfectly landlocked.

Between l'Esperance point and Dead islet, close to the northward of Hope isle, there are 15 to 7 fathoms water; but at three-quarters of a mile to the north-westward of the islet are two rocks bordered by reefs. There is a rivulet half a mile to the north-westward of the two rocks; but the water is brackish, and difficult to be obtained.

Dover township in the north-western part of the port is in telegraphic communication with Hobart. There is much fine timber in the neighbourhood, which gives employment for several saw mills.

Water.—There is a narrow bight in a sort of ravine formed between the heights of Folkestone on the southern shore, to the south-westward of Hope isle, having 7 fathoms in the entrance and 4½ to 2¾ fathoms farther in; and affording shelter for heaving down a vessel. At the bottom of the bight is a rivulet of excellent water.

Roaring Bay.—From l'Esperance point the coast trends N. by E. three-quarters of a mile to a point, having a small bight on its west side; between this point and another projection about N. by E. ½ E. 2 miles from it, there is an indentation, of which the northern bight is Roaring bay. From the north-east point of this bay the coast trends North two-thirds of a mile to Huon point, the western entrance point of Huon river: about a mile westward of Huon point the land rises to mount l'Esperance.

TASMAN HEAD and FRIAR ROCKS.—Tasman head, the south extreme of South Bruny island, forming the north-eastern point of the southern entrance of D'Entrecasteaux channel, is high, abrupt, and composed of basaltic pillars, with a shoal extending from it between S. by W. and S.E. by S. 1¾ miles, on which are several small islets and numerous rocks, some of the former producing vegetation. The easternmost two of the Friar rocks are pyramidal in shape, and, except where whitened by the gannets, have a black, weatherbeaten appearance; a patch of breakers is said to lie one mile to the north-eastward of them, but the south-eastern most of these dangers appears to be a patch lying S.E. ¾ S. 2 miles from Tasman head.

From Tasman head to East head, nearly W.N.W. 2¼ miles, the coast is somewhat embayed, with high land behind it, mount Bruny, about N.N.W. 2 miles from Tasman head, being 1,059 feet high.

CLOUDY BAY, a bight in the southern end of South Bruny island exposed to all the fury of south-west gales, is 3 miles wide, E. ¾ N. and W. ¾ S. at its entrance between East and West heads, whence it extends 3¼ miles northward to a long narrow tongue of land stretching westward from the eastern side, and separating this bay from Cloudy lagoon. The eastern shore of Cloudy bay for the first 1¾ miles is rocky and irregular, the most projecting danger being a reef with dry rocks upon it, extending one-third of a mile from a point about midway between East head and the head of the bay. Another reef projects from the north extreme of this point, on the east side of which is a small bight, with depths of 3½ to 1½ fathoms water. The east side of Cloudy bay between this bight and a projection of the northern shore appears to consist of a sandy beach. The western shore has several small open bights, and the head of the bay is exposed to a great surf.

Cloudy Lagoon is a shallow sheet of water 1¾ miles long, E.N.E. and W.S.W., 1¼ miles wide, and communicates with the north-west corner of Cloudy bay by a narrow channel trending North and South two-thirds of a mile. The land for about 1½ miles northward of the lagoon is low and swampy.

The Coast between West head and another point lying S.W. by W. ¾ W. from it, and S.E. half a mile from cape Bruny, forms an exposed bay 1½ miles wide and three-quarters of a mile deep, its bight being apparently a sandy beach.

CAPE BRUNY, the south-west point of South Bruny island, is 291 feet high, with mount Barren one mile to the northward of it.

LIGHT.—Cape Bruny is distinguished by a white lighthouse, 44 feet high, exhibiting at an elevation of 335 feet above the level of the sea, a light, which *revolves every minute and forty seconds,* visible in clear weather from a distance of 22 miles.

From a distance of 10 miles the light appears *bright* for *fifty* seconds, and *eclipsed* for *fifty* seconds.

Courts Isle extends from a few yards to half a mile southward of cape Bruny, and is nearly a quarter of a mile wide, with dry and covered rocks extending a quarter of a mile southward and south-westward from it.

Soundings.—About 2½ miles southward of Tasman head there are 20 fathoms, rock, and S.S.W. 3½ miles from the head there are 25 fathoms, also rocky bottom; but between these depths there is no bottom at 40 fathoms. From the latter depth to within 1½ miles of the entrance of Cloudy bay there are 29 to 27 fathoms, and from South round by S.W. to N.W. at the distance of 4 miles from cape Bruny, there are 50 to 29, 33 and 28 fathoms, with regular soundings between these depths and the south-west coast of South Bruny island.

STANDAWAY BAY is an indention of the south-western coast of South Bruny island, extending from cape Bruny N.W. ¼ N. 4¾ miles to a cluster of rocks, above water, projecting a quarter of a mile from the shore at one-third of a mile southward of the west point of the island. This bay, which is barely three-quarters of a mile deep, has a rocky exposed shore, with several detached dangers lying between 2 and 3 cables from it. About three-quarters of a mile to the south-eastward of the north-west extreme of the bay mount Bleak rises from the shore.

About N. by E. half a mile from the west point of Bruny island is a projection having some rocks above water close to its west side, E.N.E. three-quarters of a mile from which is a third point forming the south-west side of the entrance of Great Taylor bay, which is separated from D'Entrecasteaux channel by a promontory stretching out nearly 4 miles in a N.W. direction from about a mile northward of mount Barren, and is three-quarters to 1½ miles broad.

Partridge Isle, which extends from about one cable to 1½ miles northward from the north-west point of this promontory, is one-third of a mile broad, with 18 to 7 fathoms water close to its west shore, and a landing-place on its east side.

GREAT TAYLOR BAY.—The entrance of this bay is 2½ miles wide from W.S.W. to E.N.E., and runs in about 3¼ miles in a S.E. ½ S. direction. The western shore for the first 2½ miles is nearly straight, and thence irregular, to the bottom of the bay. A patch, which covers at high water, lies near this shore 2½ miles from the western entrance point. The eastern shore of Great Taylor bay consists of projecting points, and bights; the most extensive of the latter being the Bay of Islands, which lies midway between the north-eastern entrance point and the south extreme of Great Taylor bay. The Bay of Islands is about half a mile wide at its entrance, whence it runs in nearly a mile to the northward. Curlew islet lies close off the northern point of the entrance of the Bay of Islands, and there is a smaller islet close to the southern shore of this bay. Oak point S. by E. ½ E. 1½ miles from Curlew islet, is the southernmost projection of the eastern shore; the bight to the south-westward of the point is apparently formed by a sandy beach.

Anchorages.—Great Taylor bay is too large to afford at all times shelter from gales. M. Freycinet anchored off the entrance at one mile to the eastward of Partridge isle, and although on weighing the anchor it brought up 1,000 lbs. weight of hard black mud, which the motion and wash of the sea did not detach, the vessels frequently dragged their anchors, even with a long scope of cable.

H.M.S. *Clio*, 1873, anchored off the Bay of Islands in 10 fathoms, muddy bottom, with the north end of Partridge island (eastern entrance point of Great Taylor bay) bearing N.W. by W. ½ W., west extreme of South Bruny island N. by W., and centre of Curlew island E. by N.

VENTENAT POINT.—From the eastern entrance point of Great Taylor bay the general trend of the western coast of South Bruny island, which is slightly embayed, is nearly North 3½ miles to Ventenat point. This point, which forms the south-west side of the entrance of Little Taylor bay, is the north extremity of a tongue of land projecting N. by W. ½ W. 2½ miles, and separating Little Taylor bay from D'Entrecasteaux channel. There are 24 to 13 fathoms between Partridge isle and Ventenat point, but a reef projects a short distance northward from the point.

Little Taylor Bay is 1½ miles wide, N.E. by E. and S.W. by W., at the entrance, whence it extends about S. by E. 2½ miles. There is a small bight in the western shore of the bay, half a mile within Ventenat point; and there is a larger, but apparently more shallow one, in the eastern shore, between three-quarters of a mile, and 1½ miles from the north-eastern entrance point of the bay. This, like Great Taylor bay, is said to be capable of receiving the largest vessels, although the anchorage in neither of them appears to be much recommended.

The western coast of South Bruny island from Little Taylor bay takes a general N. by E. ½ E. direction 6¾ miles to Simpson point, the north extremity of a projecting part of the island, stretching out 3½ miles to the northward, and separating Isthmus bay on its east, from D'Entrecasteaux channel on its west side.

Satellite Isle, N.N.E. ½ E. 2½ miles from Ventenat point, and half a mile from the shore, is about two-thirds of a mile long, N.W. and S.E., and a quarter of a mile broad, with 9 fathoms water near its north-west end, and 7 fathoms between it and Ventenat point.

ZUIDPOOL ROCK, which is about 50 yards in extent, and has 9 feet water on it, lies in midway between Ventenat point and Huon isle, with the north-east extremes of Huon and Garden isles in line, bearing N.W. by N., and Satellite isle E. by N., Huon and Satellite isles being each distant 2 miles. The neighbourhood of this danger has not been examined, but as it lies nearly in the fairway, it may be presumed there is deep water near it, although it should be passed with caution. A black can buoy has been moored on this danger.*

Huon Isle, which lies close off the entrance of Huon river, 1¾ miles eastward of Huon point, is three-quarters of a mile long, N.E. and S.W., and one third of a mile broad, with 16 fathoms water half a mile off its south-east point.

HUON RIVER.—Adelaide.—Huon river is 2¾ miles wide at its entrance from Huon point to another point bearing E. by N. from it; a cluster of rocks lie off this point, between which and Huon isle there is a channel two-thirds of a mile wide. The south-western shore of Huon river from Huon point, extends N.W. by W. 6¾ miles to a projecting part of Adelaide, which is a small settlement, between Surges bay on its south-east side and Flight bay to the north-westward of it. The objects along this shore which appear most worthy of notice, seem to be Surveyor bay, two-thirds of a mile within Huon point; Police point, N.W. 2 miles from Surveyor bay; Desolation bay W. by N. ½ N. 1½ miles from Police point; and White bluff, N.W. ½ W. 1¼ miles from Desolation bay; close to the westward of the bluff is Flower-pot rock, above water.

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* Zuidpool rock buoy is small and difficult to make out.—Navigating Lieutenant A. F. Gibbons, H.M.S. *Clio*, 1873.

H.M.S. *Danäe* in passing the rock at the distance of a mile could see no trace of the buoy.—Lieutenant J. St. C. Bower, February, 1879.

The Butts.—The north-eastern shore of Huon river, from its eastern entrance point, trends N.W. by W. 1¼ miles to a small peninsular point S.W. ½ W. nearly one mile from which is a rocky patch, covered at high water, named the Butts, having an iron beacon with a square sheet-iron vane.

Garden Island and Rivulet.—Between the small peninsula just noticed and a point W. by N. ¾ N. 2½ miles from it, and half a mile south-eastward of Cygnet point, is a bight 2 miles wide and 1⅓ miles deep, having in its centre Garden island, which is three-quarters of a mile long North and South, and one-third of a mile broad. This island gives the name to a rivulet flowing into the bight half a mile to the north-eastward of the north point of the island; there is a small cove one mile to the westward of the rivulet.

Cygnet Point is a broad projection between a small cove on its south-east side and Abel bay on its north-west side, and forms the south-eastern point of the entrance of port Cygnet. Abel bay, which is little more than a quarter of a mile in extent, is the south-east extreme of port Cygnet.

PORT CYGNET.—Port Cygnet is 1¼ miles wide at its entrance from Cygnet point to Beaupré point, in a N.W. by W. ½ W. direction and extends 4 miles to the northward. The eastern shore of the port is broken and irregular, consisting of points and bights. Deep bay, the southern most and largest of these bights, lies between one and 2 miles northward of Cygnet point, and extends nearly three-quarters of a mile in a north-east direction. On the north side of a projecting point of Welsh, one mile northward of the north point of Deep bay, is an inlet a quarter of a mile wide, extending about double that distance to the eastward. This inlet is separated from a similar one at the head of the port by two projecting points.

Port Cygnet is a post town and telegraph station, 36 miles S.W. from Hobart, and 7 miles from Franklin. Fruit is grown in the neighbourhood, and alluvial gold has been found.

Lovett is a small township with a population in 1881, of 115, and in the district of about 1,300. The country round is agricultural and timber producing.

The Western Shore of port Cygnet from Beaupré point, trends N.N.E. ¾ E. 1½ miles to a point projecting from Lymington, between which and another point N. ¾ W. three-quarters of a mile from it, is a bay two-thirds of a mile deep, with 3½ fathoms water in its centre. The western bight of this bay has a sandy beach, to the northward of which is a small inlet. From the north point of the bay of Lymington the western shore of port Cygnet extends N. by W. ¼ W. 1¾ miles to Lovett, at the north extreme of the port, where it forms a narrow shallow inlet.

Each of the five bights just described receives a small stream flowing from the neighbouring hills, of which hills mount Cygnet, N.E. ½ N. 4¾ miles, and mount Morrison, N. ½ E. 5½ miles from Cygnet point, appear most worthy of notice; but mount Grey, N.N.W. 3½ miles from mount Morrison, seems the most elevated, being 2,713 feet high.

The shores of port Cygnet are a little elevated, and generally steep; their declivity is gentle, and the remarkable fertility of the soil offers everywhere the most enchanting and varied appearance. In several places natural quays are formed, easy of access for the largest vessels, or even for the purpose of careening. The middle of the harbour has from 3½ to 7 fathoms water, upon a mud and sandy bottom; and with the exception of the interior of some of the bays, a depth of less than 3 to 4 fathoms is seldom found at distance about 100 yards. The only river of any importance found by the French navigators, and that appeared to them to possess fresh water all the year, was Fleurieu river, but its opening was marshy and obstructed by a bank of sand, which obstructed its approach.*

The north-eastern shore of Huon river, between Beaupré point and Poverty point, one-third of a mile to the north-westward of it, is a cove, whence the shore trends N.W. by W. ¾ W. 2 miles to a small stream, with a rock close off it, and thence W. by N. 1¾ miles to One Tree point, at Brabazon; midway between the stream just noticed, and One Tree point is Petchy bay, which is barely a quarter of a mile in extent.

California Bay.—From One Tree point, Huon river takes a N. ¾ E. direction for nearly 10 miles, with an average width of half a mile. Its eastern shore from One Tree point to California bay, 5 miles to the northward of the point, is irregular, and intersected by several small streams; but for the next 5 miles it is nearly straight.

Hospital and Castle Forbes Bays.—The western shore of Huon river from Flight bay to abreast of California bay, consists of points and bights, the largest two of the latter being Hospital and Castle Forbes bays. Hospital bay, which lies N. by W. ½ W. 1½ miles from One Tree point, is two-thirds of a mile wide, N. by E. and S. by W., at the entrance, whence it trends nearly one mile to the westward, with a small inlet in its S.W. corner. The bight of the bay is mostly occupied by an islet and shoal water. From the northern point of Hospital bay the shore trends N.N.W. ½ W. 1¼ miles, and N.E. ½ N. the same distance, to Bullock point, the intermediate bight being Castle Forbes bay, between which and Bullock point is a smaller bay.

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* Freycinet, Terr. Aust., p. 84.

Franklin.—For about 6 miles above Bullock point the western shore, which is nearly straight, forms the water frontage of Franklin. There are 10 to 4½ fathoms water between One Tree and Bullock points, but from nearly abreast of, to 5 miles above the latter point, the river is mostly filled by the Egg isles.

The township of Franklin is 30 miles S.W. of Hobart; in 1881, the population was 457, and of the district 3,415. It is a telegraph station and has daily communication with Hobart by mail coach. The country around is thickly timbered, giving employment to several saw mills; much fruit is also grown.

Victoria.—At 6 miles above Bullock point Huon river turns N.W. ½ N. 2 miles to Victoria, whence, after being joined by a small stream from the north-eastward, it becomes a mere rivulet, flowing from the westward.

Victoria is situated on the banks of Huon river, at its junction with Mountain river, and is connected with Hobart by a good road. The principal industry is the timber trade. Coal has been found. It is a telegraph station; and a mail coach runs daily to Hobart.

Arch islet is a perforated rock lying E. by N. ½ N. 1½ miles from Huon isle, and half a mile from the shore.

THREE HUTS POINT.—Gordon.—The western shore of D'Entrecasteaux channel from the eastern entrance point of Huon river, after turning three-quarters of a mile to the north-eastward, trends nearly East 2 miles, and then again turns north-eastward 1½ miles to Three Huts point, behind which is Three Huts point or Gordon. There are 3½ to 4½ fathoms water close along shore for about 1½ miles south-westward from Three Huts point.

Three Huts point or Gordon is a village with about 100 inhabitants. It is a port of clearance, and has a telegraph office.

Mount Royal, W.S.W. three-quarters of a mile from Three Huts point, is an elevated part of Gordon, rising to the height of 1,149 feet, and forms the southern end of the mountain range extending 17 miles in a N. by W. direction.

Long Bay Bank.—From Three Huts point the coast trends N. ¼ E. 2½ miles to Whale-boat rock, above water, and thence N. by W. ¼ W. 2 miles to Fleurty point, half a mile to the southward of which is Flower-pot rock, close to the shore. On the north side of Three Huts point is a shoal bight about a quarter of a mile wide. A bank borders the coast, between Three Huts and Fleurty points, and extends two-thirds of a mile to a quarter of a mile from the shore, projecting farthest from the land one mile northward of Three Huts point. Four large beacons erected, in 9 feet water, marked the most prominent parts of this bank in 1868; and it may easily be avoided by knowing its general trend, which appears to sweep uniformly round from Three Huts point to Fleurty point. The channel between this bank and Simpson point, is about one mile wide, with 7 and 8 fathoms water in the fairway and on the east side.

Current.—The prevailing current in this channel sets in a northerly direction, one to 2 knots, according to the wind.

Birch, Peppermint, Trial, and Flight Bays.—From Fleurty point to the north-east point of Oyster cove, N. ½ E. 4¾ miles from it, the western coast of D'Entrecasteaux channel is embayed to the depth of a mile, and consists of alternate bays and points, nearly all the bays having a small stream flowing into them.

Birch bay, the southernmost and widest of these bays, extends from Fleurty point N.N.W. ½ W. 1¼ miles, and is one-third of a mile deep. Peppermint bay forms a double bight, extending N. by W. one mile from the northern point of Birch bay. Between the north point of Peppermint bay, and another projection N. by E. ½ E. nearly 1½ miles from it, there are three bights, the second and third of which, from the southward, are Trial and Flight bays.

Little, and Oyster Coves lie between the north-east point of Flight bay, and a projecting point N.E. by N. 1¾ miles from it, and are separated from each other by a broad projection of the coast. Little cove is one-third of a mile across at the entrance, and half a mile deep: Oyster cove is double that width and depth.

NORTH-WEST BAY.—Margate.—From the north-east point of Oyster cove the coast extends N. ¾ E. 1¾ miles to Snug point, the southern side of the entrance of North-west bay, which is nearly 1¼ miles wide S. by W. ½ W. and N. by E. ½ E.: there are 3½ fathoms close to Snug point, and 10 to 15 fathoms thence across the entrance to the opposite point. The two entrance points are high and rocky; but the shores of the bay are much lower, and easy of access. Within its entrance North-west bay extends 4 miles North and South, and 2 miles from its entrance to its western shore. The southern shore from Snug point, trends W. ½ N. 2 miles to Snug bay, three-quarters of a mile to the northward of which is Snug rivulet, whence the western shore extends N. ½ E. 2¼ miles to the eastern point of Margate, between which and the north corner of the bay one mile to the northward is a shoal bight, with North-west Bay river flowing into it. From the north corner of North-west bay, its north-eastern shore trends nearly S.E. by S. 3¼ miles to the northern entrance point. The shores of the bay may be approached within a quarter of a mile in 3½ fathoms to 8 fathoms water.

Margate is a little place with a population of 70 people. The district is agricultural.

Mount Louis.—Signal Station.—Pierson Point.—From the northern entrance point of North-west bay the coast turns N.E. by E. one mile to Pierson point, which forms the north-west side of the northern entrance of D'Entrecasteaux channel. At half a mile to the north-westward of Pierson point mount Louis rises to the height of 683 feet.

There is a telegraph signal station on mount Louis communicating with mount Nelson at 7½ miles farther to the northward, and 2½ miles southward of Hobart, which transmits all necessary information from the entrance of Derwent river. Another line of telegraph extends easterly from mount Nelson to port Arthur and Fortescue bay, by which the approach of vessels between Maria island, and cape Pillar is made known.

ISTHMUS BAY.—The entrance of this bay extends from Simpson point N.E. ½ E. 2¼ miles, and the bay is 3 miles deep; its western shore from Simpson point, trends S. by E. ¾ E. 3¼ miles to a small inlet having an islet in it, whence the south-eastern shore, which is bordered by shoal flats, curves nearly 4 miles in a N.N.E. direction to a small projecting point, with a similar one at a quarter of a mile to the northward of it. The south-eastern shore of this bay is only separated from Adventure bay, on the east side of Bruny island, by an isthmus, which for a distance of 2 miles, is but one to 2 cables broad, nearly dividing the island midway between its northern and southern ends. On the north side of the northern of the two small projecting points just noticed, is a cove half a mile wide, whence the eastern shore of Isthmus bay trends N.W. by W. three-quarters of a mile to a point which separates this from Great bay, to the northward.

Great Bay is 2 miles wide, N. by W. ¾ W. and S. by E. ¾ E. at its entrance, and nearly 2¼ miles deep; one mile within its entrance the bay is contracted to 1¼ miles in width by projections of the northern and southern shores, within which it again expands to nearly 2¼ miles, North and South. There is a small cove on either side of a broad projecting part of the southern shore, and there is an inlet in the north-eastern extreme of the bay, with apparently a narrow channel into it through the flats which border the eastern shore.

Missionary Bay.—From Stockyard point—a double projection which separates Great bay from Missionary bay, to the north-westward of it—the entrance of Missionary bay extends W. ½ S. 1½ miles to Soldiers point, whence the bay runs in about one mile to the north-eastward.

Snake Islet.—Between Soldiers point, the western extreme of Missionary bay, and a narrow point between two small coves, W. by N. ½ N. one mile from Soldiers point, is a bay one mile deep, in the inner part of which is Snake islet. From the western point of this bay, the coast turns N.N.W. half a mile to Kinghorn point, thence N.N.E. ½ E. half a mile to the south-eastern point of Apollo bay, which is half a mile deep; from the south-east corner of Apollo bay the coast trends N.N.W. three-quarters of a mile to Roberts point. The channel between Apollo and Peppermint bays is 1½ miles wide, with 5½ to 10 fathoms water close to the eastern shore, and 11 fathoms in the fairway.

Barnes Bay.—From Roberts point the coast trends N.E. ½ E. 1½ miles to the south-western entrance point of Barnes bay, which is half a mile wide, N.E. and S.W., at the entrance, whence it runs in 2 miles to the north-eastward. At half a mile south-eastward of the south-western entrance point of the bay is Sykes cove, which is half a mile wide at the entrance, whence it trends S.E. three-quarters of a mile towards the bight of Missionary bay. From the eastern point of the cove the south-eastern shore of Barnes bay extends N.E. nearly 1½ miles, to a point, between which and a projection of the northern shore, the bay is contracted to a channel one-third of a mile wide, leading into Simmond bay, the inner part of Barnes bay, which extends 1¾ miles North and South, forming two narrow bights, one trending to the northward and the other to the southward.

Petchey Cove, which lies between the north-eastern entrance point of Barnes bay and another point N.W. by W. from it, is half a mile wide at the entrance, whence it runs in three-quarters of a mile to the N.N.E.

NORTHERN ENTRANCE of D'ENTRECASTEAUX CHANNEL.—From Woodcutters point, which lies N.N.W. ½ W. two-thirds of a mile from the north-west point of Petchey cove, the coast, after turning half a mile to the eastward trends nearly North 1½ miles to Bligh point, whence it curves 1¾ miles in a N.N.E. ½ E. direction to Kelly point, which forms the south-east side of the northern entrance of D'Entrecasteaux channel, and is the north-west point of cape Delasorte, the north end of North Bruny island. This entrance, which is half a mile wide, has 3 fathoms water close to Pierson point, and 6 and 7 fathoms in the fairway.

The navigation of D'Entrecasteaux channel is not difficult either by day or night, if provided with the Admiralty chart, the principal dangers being the Actæon shoals, Zuidpool rock, and the bank which borders the western shore between Three Huts, and Fleurty points. In passing the valleys and mountains, strong gusts and contrary winds are met with, and a moment afterwards it falls quite calm, an inconvenience common to lands of this description. At the various anchorages much trouble is found in weighing the anchor, in consequence of the tenacity of the muddy bottom which everywhere exists.

Captain J. Welsh, who surveyed the south part of D'Entrecasteaux channel in 1825, says:—"This channel, which affords at once the safest shelter for shipping, perhaps in the world, is not to be recommended as a passage for sailing vessels bound to Hobart, except in the summer season, when dependence may be placed on the sea breeze, as the following observations will demonstrate.

"In making the land from the westward, ships have frequently taken this passage, as affording immediate anchorage, secure from all winds; but they are likely to be detained several days before they can reach Hobart. The detention is caused by the direction given to the wind, even when it blows strong at sea from the S.W., by the high hills and deep openings that form the western coast of the channel; such as South port, port Esperance, Huon river, and the opening to the river above Garden island, each of which gives a respective or distinct course to the wind.

"Experience proves that the passage to Hobart by Storm bay is preferable. I have, in several voyages to this colony, found great advantage by taking this route, and strongly recommend all commanders to follow it."

DIRECTIONS.—In proceeding through D'Entrecasteaux channel for Hobart, a vessel from the westward, not having a pilot should on no account pass between Actæon shoals and the western shore; but having arrived abreast of Whale head, should bring it to bear S.W. by W., and not to the southward of that bearing until the lighthouse on cape Bruny bears N. by E. ¾ E., at which time S.E. Break (Actæon shoals) will bear W. by N. distant 2¾ miles; from that position steer N. by W. 11 miles, or till the opening between Partridge isle and the point to the southward of it bears East: this course will keep the vessel in mid-channel and free from all dangers.

In baffling or contrary winds, vessels should keep on the eastern shore, which may be approached boldly. Several reefs and rocks being on the western shore higher up than the Actæon shoals, it will be necessary to approach that shore with great caution, until South port opens out, and the lighthouse on cape Bruny is brought to bear E. ½ S.

Vessels working in the channel must be careful to keep the lead going and not approach Actæon shoals to less than a depth of 20 fathoms. After having passed South port, the shore on either side may be approached to half a mile.*

From abreast of the south end of Partridge island steer N.E. by N. 12 miles to abreast of Three Huts point, going between Zuidpool rock and Satellite isle, keeping a good look out for the rock. After passing Three Huts point borrow towards Simpson point, to avoid the bank which borders the shore between Three Huts and Fleurty points, and then proceed northward in the fairway through the remaining portion of the channel.

BRUNY ISLAND, of which the southern and western coasts have been already described as the northern and eastern shore of D'Entrecasteaux channel, is 27 miles long from Tasman head to cape Delasorte, in a N. ½ W. direction, and 9 miles across at its southern and broadest part. A ridge of hills extends along the eastern side of the island, from Tasman head to Simpson point. At nearly midway between the north and south ends of the island it is nearly divided by the long isthmus, before described, between Isthmus and Adventure bays.

The Eastern Coast of Bruny island from Tasman head, trends N.E. 1½ miles to a projecting point, from which it extends N. ½ W. 4 miles, and then turns S.E. half a mile to a double point, half a mile broad, close to the southward of which is Arched islet; a narrow reef borders the shore between one and 1¾ miles south-westward of Arched islet. Between the double point and cape Connella, N. by E. ½ E. 3 miles from it, the coast is embayed to the extent of three-quarters of a mile. There is a sunken rock in the south-western part of this bight, and two small islets lie near the shore at three-quarters of a mile and 1¼ miles to the south-westward of the cape.

CAPE FLUTED.—From cape Connella the coast trends N. ¾ W. 1½ miles to cape Fluted, and thence N.W. by W. 1¼ miles to the north point of Cookville, close off which is Penguin island. Cape Fluted is high and steep, composed of basaltic columns, and covered with trees. Penguin island, of moderate height, is also covered with trees. There are 22 fathoms water at a quarter of a mile from the shore between cape Fluted and Penguin island.

ADVENTURE BAY extends from Penguin island N. by E. 6 miles to cape Frederick Henry, and is 3 miles deep. From Penguin island the shore first trends S.W. by S. 1½ miles, then curves 1¾ miles in a N.W. ¾ W. direction, forming a bight having 7 to 3 fathoms water, with some fresh water rivulets flowing into it. From the western point of this bight a rocky shore sweeps round N. by W. 2¼ miles to a sandy beach extending N.N.E. ¾ E. 5¼ miles; this beach, which is slightly curved, forms the south-east side of the long isthmus between Isthmus and Adventure bays; a lagoon extends behind the beach for more than a mile from its north-east end. Between this beach and cape Frederick Henry, E.S.E. one mile from it, is a small exposed bight.

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* Nautical Magazine, 1838, p. 685.

There are 10 to 7 fathoms close to Penguin island; and 21 fathoms at 3½ miles to the northward of it, with decreasing depths towards the south-western shore, close along which there are 9 to 12 fathoms water.

Wood and Water.—This bay, well sheltered from south-west and westerly winds, abounds with wood and water; but they are difficult to obtain on account of the heavy surf which generally breaks upon the beach.

CAPE FREDERICK HENRY.—Variety and Trumpeter Bays.—From cape Frederick Henry, which has a rock close off it,* the coast extends N. ¼ W. 3 miles to a projection, between which and some rocks near the shore N.W. ½ N. 1¼ miles from the projection, is Variety bay, but it is barely a quarter of a mile deep. From these rocks the coast trends N.W. by N. one mile to the south-east point of Trumpeter bay, which is three-quarters of a mile wide N.W. and S.E., and half a mile deep: there is a rock above water close to the southern shore of the bay, with which it is connected by a reef.

YELLOW BLUFF.—ONE TREE POINT.—From the north-west point of Trumpeter bay an irregular coast trends N. ½ E. one mile to Yellow bluff, and thence nearly in a direct line, N.N.W. 2¼ miles to One Tree point.

Kelly and Bull Bays.—Between One Tree point, and the east point of cape Delasorte, N.W. ¼ N. 2½ miles from it, are Kelly and Bull bays, separated from each other by a broad rocky point: there are 7 to 2 fathoms within a quarter of a mile of the shores of these bays, but they are mostly bordered with rocks. From the east point of cape Delasorte, its north-eastern shore trends W.N.W. nearly one mile to Kelly point, and is bordered with rocks, outside which, at about one-third of a mile to the north-eastward of Kelly point, there are 9 feet water.

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* The rock off cape Frederick Henry is not quite as high as the cape, it is of a conical shape, and shows out well.—Lieutenant F. W. Barrett, H.M.S. *Danäe*, 1881.

DERWENT RIVER.—This river, which is 130 miles long, has conspicuous marks at its entrance, mount Louis a conical hill 683 feet high with the signal station, on the west side; and on the east side, Iron Pot islet with the lighthouse, bearing E. by N. ½ N. distant 3 miles from Kelly point, the north extreme of cape Delasorte, and Betsy isle 3 miles to the eastward of Iron Pot islet.

The entrance of Derwent river between the east point of cape Delasorte and Derwent lighthouse, is 2½ miles wide, with depths of 10 to 8 fathoms, sand and broken shells. Thence the river retains an average width of about 2½ miles for the distance of 12 miles to Hobart, the soundings in mid-channel increasing to 20 fathoms at 6 miles above the entrance, and from this depth decreasing to 12 fathoms close to the town. There are generally 10 to 12 fathoms within half a mile of, and at least 3 fathoms a quarter of a mile from either shore.

LIGHT.—Derwent lighthouse, which stands on Iron Pot islet half a mile southward of cape Direction, is a square tower 40 feet high, painted *red*, exhibiting a *fixed* white light 65 feet above the sea; visible in clear weather, from a distance of 12 or 14 miles. The channel between the lighthouse and cape Direction is rocky, only leaving a narrow passage for small vessels.*

Blackman Bay.—The western shore of Derwent river from Pierson point trends N.N.W. 3 miles to the southern point of Blackman bay, close off which are some dry and covered rocks. This bay extends half a mile North and South, and is a quarter of a mile deep, with 6 fathoms close off its entrance, and 6 feet near the shore.

Kingston.—Brown River.—From Blackman bay the shore trends North two-thirds of a mile to the south point of the bay of Kingston, which thence extends North one mile, and is half a mile deep, with 12 to 9 fathoms water in the entrance, and 9 to 6 feet near the shore. Brown river flows into this bay, at one-third of a mile within its north point.

Kingston is on Brown river in a grazing and fruit district, and in 1881 had a population of 171 inhabitants. It is 10 miles south of Hobart, and connected with it by telegraph, and a mail coach which runs daily.

Alum Cliffs.—Crayfish Point.—From the north point of the bay of Kingston the rocky shore trends irregularly N. by E. ½ E. half a mile to the south-western point of the bay of Alum cliffs, which extends thence N.N.E. about one mile to Crayfish point. It forms a double bight, a quarter of a mile to one-third of a mile deep, with 7 to 4 fathoms across its entrance, and 3 to 3½ fathoms one cable from the shore, which is partly bordered by rocks. Alum cliffs are precipitous and conspicuous, when seen from the distance of a mile.

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* This light, formerly known as Iron Pot light, is now known as Derwent light.—July 1884.

From Crayfish point the rocky shore extends North, 1¾ miles, when a succession of rocky points and small beaches trends N. by W. ½ W. about half a mile to One Tree point, a rocky projection between which and Sandy Bay point, N.W. by N. one-third of a mile from it, is a smooth beach.

Near Sharp hill there is a conspicuous white tower about 60 feet high and 250 feet above the sea.

The shore from Pierson point to Sandy Bay point, although rocky, is bold, there being generally 5 fathoms water a quarter of a mile from the shore, except off One Tree point, where there are 5 fathoms nearly one-third of a mile from the point.

MOUNT NELSON.—SIGNAL STATION.—From Sharp hill three-quarters of a mile northward of Brown river, a range of forest hills extends in a N. ½ E. direction 2½ miles to mount Nelson, which is 1,191 feet high, having a telegraph station on it, communicating with mount Louis and Hobart, the Commercial code, as well as local signals being used. Gentle slopes and spurs descend from this range to the shore from the Alum cliffs to Sandy Bay point.*

Sandy Bay Point is the north-eastern extreme of low flat land projecting about a quarter of a mile from the more elevated, well-wooded, and partly cultivated land which descends from mount Nelson.

Sandy Bay extends from Sandy Bay point N.W. ¼ W. 1½ miles to Battery point, the south-east extreme of Hobart; a smooth beach trends 4 cables westward from Sandy Bay point to a Rocky head, whence the shore, consisting of rocky points and sandy beaches, extends nearly W.N.W. half a mile to Dunkley point, which projects 1½ cables from the line of coast, its outer part being closely fringed with dry and covered rocks, with 6 to 15 feet water close to them. From the inner part of Dunkley point the shore trends N.W. by W. 3 cables to a small stream, and thence turns N. by E. one-third of a mile to Wellington rivulet, one cable to the southward of which are some bath-houses. From Wellington rivulet the south-eastern water frontage of Hobart, with its patent slips and jetties, trends N.E. ½ N. 3 cables to Battery point, and thence nearly N.N.W. a quarter of a mile to the southern point of the entrance of Sullivan cove, the principal anchorage of Hobart.

Ridges of well-wooded and partly cultivated land descend from mount Nelson to the shore between One Tree point and Hobart, with several small streams flowing into the bay. A road from the southward to Hobart passes by the villages and houses which are situated near the shore of Sandy bay.

From 100 yards to a quarter of a mile north-westward of Sandy Bay point there are 5 to 10 fathoms water, with uniform soundings in 12 fathoms thence to one cable off Battery point. The shore of Sandy bay may be approached to 1½ cables in 5 fathoms, and to one cable in 3 fathoms, except at one-third of a mile south-eastward of Dunkley point and at a quarter of a mile southward of Battery point, where the 3-fathoms edge of the bank which borders the bay, projects 1½ cables and the 5-fathoms edge nearly a quarter of a mile from the shore. But Dunkley point may be approached from the eastward to 150 yards, and from the northward to 50 yards, in 5 fathoms, and to about two-thirds of those distances in 3 fathoms. A detached bank, about one-cable in extent, with 3½ to 5 fathoms water on it, lies N.W. by W. 4 cables from Sandy Bay point; with this exception the depth of water gradually decreases towards the shore.

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* *See* Admiralty plan port of Hobart, No. 105; scale, m = 10 inches.

SOUTH ARM is a peninsula from one mile to a quarter of a mile broad, extending from cape Direction, the south point of the arm N. by W. ½ W. 5⅓ miles to Jane point, which forms the south side of the entrance of Ralph bay. This peninsula is mostly covered with open forest; the land for about 1½ miles northward of cape Deliverance, and between 1½ and 2½ miles southward of Jane point, being elevated; having two hills near cape Deliverance, and one 400 feet high, S. by E. ½ E. 2 miles from Jane point; the remaining portion of the arm is undulating with low narrow flats between the more elevated land.

The Eastern Shore of Derwent river is partly formed by the south arm, which extends from cape Direction N.W. one mile to the southern point of Half Moon bay, and forms three bights, the north-westernmost and largest of which has 3 fathoms water; but the southern point of the bay and the projecting point between it and cape Deliverance have only 12 feet water 2 cables from them.

Half Moon Bay extends 1¾ miles, N. by W. ½ W. and S. by E. ½ E., and is three-quarters of a mile deep, with depths of 5 and 6 fathoms in the middle, and one to 4 fathoms close along shore.

From the north point of Half Moon bay the shore trends N. ½ W. one mile to the southern point of Opossum bay, close to the southward of which is a small cove with 2 fathoms water in it. At half a mile north-westward of the northern point of Half Moon bay is a 4-fathoms bank a quarter of a mile off shore, with 5 fathoms inside it.

Opossum Bay is three-quarters of a mile wide, from S.S.E. to N.N.W., and half a mile deep, with depths from 6 to 2 fathoms. This bay is separated from a bight to the northward of it by a broad hilly point, partly fringed with dry and covered rocks, whence the bight extends N.N.E. ½ E. three-quarters of a mile to Jane point, having a depth of 3 fathoms; but its shore is rocky.

TRYWORK POINT is situated 1½ miles to the northward of Jane point. Trywork point and the rocky shore, extending half a mile to the eastward from it, form the north side of the entrance of Ralph bay, and the south end of the North arm. This arm, which separates the northern part of Ralph bay from Derwent river, is 2 miles long, North and South-three-quarters of a mile to half a mile broad, consists of a series of undulating grassy hills, with patches of cultivation.

From Trywork point, the eastern shore of Derwent river curves North, 1¼ miles, and thence N. by W. ½ W. 1⅔ miles to a projection of the shore, between which and Kangaroo bluff, 1⅔ miles to the westward of it, are two small bays, of equal size, separated from each other by a broad rocky point, at the foot of a hill close to the northward of it. The shore from Trywork point to Kangaroo bluff, although rocky, has depths from 2 to 6 fathoms about a cable from it, and may be approached within one-third of a mile in 12 fathoms.

KANGAROO BLUFF is the cliffy south point of an elevated peninsula, extending N.N.W. half a mile to Bellerive pier, one cable to the eastward of which is Dawson's wharf: from the bluff the western shore sweeps round in a N.W. and North direction to the pier, and although rocky, it may be approached within 100 yards in 3 fathoms water.

Kangaroo Bay lies between Kangaroo bluff, and Montagu point W.N.W. three-quarters of a mile from it; from 1½ cables W.N.W of the bluff to the same distance E.S.E. from the point, there are 7 to 10 fathoms water in the entrance, whence the bay trends three-quarters of a mile in a N.E. direction, gradually decreasing to one cable in width between Bellerive pier and a low point projecting a cable from the opposite shore. From Montagu point the north-west shore of Kangaroo bay, for about half a mile, may be approached to 50 yards in 3 fathoms, thence the edge of the northern bank trends eastward to 50 yards North of Bellerive pier. Above the pier the bay expands to 2 cables in width, but it is filled by a flat, on which the greatest depth of water is only 15 feet. From 7 fathoms in the entrance the depth of water decreases to 4 fathoms about 50 yards N.W. of the pier.

Bellerive is a suburb of Hobart, with a population of 270 inhabitants, on the opposite side of the Derwent. Steam ferry boats ply across to Hobart.

Montagu Point, which has a depth of 8 fathoms within 150 yards of it, is the south-west extreme of a hilly wooded promontory projecting three-quarters of a mile from the north-eastward, its most elevated part being a hill 316 feet high, situated N.N.E. ½ E. half a mile from the point.

Montagu Bay. — From Montagu point the shore trends N. by W. ½ W. one-third of a mile to the southern point of entrance to Montagu bay, which extends thence N. by W. ½ W. one-third of a mile. Between the south entrance point of the bay and a rocky spit, 2 cables to the north-eastward of it, is a shoal bight with only 12 feet water a cable from the shore; but the northern shore may be approached to about 50 yards in 3 fathoms water. The bay runs in nearly one-third of a mile in a N.E. direction, erminating in a small shallow cove, on the north-western shore of which are some smelting works. From 7 fathoms in the entrance the depths decrease to 3½ fathoms at 100 yards to the southward the smelting works.

Soundings.—About a quarter of a mile northward of Montagu point there are 11 and 12 fathoms 150 yards from the shore; but there are only 4½ fathoms at that distance off the south point of Montagu bay. Between a quarter of a mile north-westward of Montagu point and 1¼ cables south-westward of the north point of Montagu bay there is a pool about 4 cables long and one wide, having depths of 24 to 26 fathoms.

ANCHORAGE will be found in any part of Derwent river, but the safest on all occasions is on the western side, the eastern being unsafe, especially for small vessels, several having been lost by anchoring near it.

PILOTS.—The only pilot station for Derwent river is at Pearson point, at the junction of D'Entrecasteaux channel and Derwent river.

The pilots are provided with a whale boat, in which they board inward bound vessels in Storm bay, at a distance depending upon the weather.*

Lights.—A harbour light is exhibited on Battery point. The light is a *fixed red* light 18 feet above high water, and visible 3 miles.

A *fixed blue* light is shown from the end of Dunn street pier.

A *fixed* white light is exhibited on the end of Elizabeth street pier.

A *fixed green* light is shown from the end of Argyle street pier.

DIRECTIONS.—There are two approaches to Derwent river, that from the S.W. through D'Entrecasteaux channel, and the other by Storm bay, between the northern part of Bruny island and Tasman peninsula, at about 12 miles to the eastward of it; but the latter approach is much to be preferred by sailing vessels, experience having taught the local traders that though apparently time and smooth water would be gained by going through D'Entrecasteaux channel, still, in consequence of violent squalls, which suddenly rush down the hills, preventing vessels from carrying sail, much time is actually lost, so that in all cases the better passage to Derwent river is through Storm bay.

Vessels from the westward bound into Derwent river through Storm bay should give Tasman head, the south point of Bruny island, a good berth, to avoid Friar rocks. In proceeding northward past cape Fluted the most remarkable object will be mount Wellington, which resembles mount Table at the cape of Good Hope, and in advancing up the bay, Betsy isle, which is high and wooded, will soon appear, when steer so as to pass on the west side of Iron Pot lighthouse. In approaching Derwent river the generally strong prevailing westerly winds make it desirable to keep within a mile of Bruny island.

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* The pilot stations formerly at Recherche bay, in the southern entrance of D'Entrecasteaux channel, and on North Bruny island, about 4 miles from Iron Pot lighthouse, are discontinued.

Having entered Derwent river between cape Delasorte and Iron Pot lighthouse, keep the western shore aboard, steering N. by W. ¼ W. and N. by E. up to a quarter of a mile off One Tree point. By keeping the Iron Pot lighthouse in sight till off Kingston, the 4 fathoms patch which lies half a mile north-westward of the northern point of Half Moon bay will be avoided.[*] After passing One Tree point steer N.W. for Sullivan cove, the usual anchorage off Hobart, where vessels may come to as most convenient; but one anchor should be laid out well to the S.E. for the convenience of getting under way. There is no danger all the way up, so that vessels may work in or out without a pilot, tacking at about a quarter of a mile off shore, and may anchor anywhere, on muddy bottom.

HOBART, the capital of Tasmania, has several public buildings and Ordnance and Commissariat stores; it is situated on a gently sloping plain at the foot of the hills that descend from mount Wellington, which bears W. by N., distant 5¼ miles from mount Nelson, and is 4,166 feet high, with Colin Bonnet, another mountain, 4,131 feet high, nearly 4 miles to the westward of mount Wellington. Between the mouth of Wellington rivulet and Battery point there are patent slips, wharves and jetties, with a hulk and several buoys moored off them, on the bank before noticed, the 3-fathoms edge of which extends 100 to 200 yards from the shore. The population in 1881 was 21,118.

Between Battery point and the southern point of Sullivan cove, N. by W. ¾ W. a quarter of a mile from it, the shore recedes into two small bights, in the southern of which is a patent slip, with a depth of 6 fathoms 30 yards from it. Midway between Battery point and the patent slip, the bank, on which several buoys are moored, projects 120 yards from the shore to the depth of 4¼ fathoms. At one cable northward of the patent slip there are 6 and 7 fathoms water within 50 yards of the shore; but a spit with 3½ fathoms projects 100 yards from the southern entrance point of Sullivan cove.

Fort Mulgrave.—Signal Station.—Fort Mulgrave, or Prince Albert battery, on which is a signal-station, is situated about one cable to the south-westward of the southern entrance point of Sullivan cove, at an elevation of 85 feet above the sea.

Time Ball.—A time ball is dropped from the flag-staff at fort Mulgrave at 1 p.m., Hobart mean time, and a gun fired near the staff.[†]

Geographical Position.—The flag-staff at Fort Mulgrave signal station is in lat. 42° 53′ 32″ S., long. 147° 21′ 13″ E.

SULLIVAN COVE, the principal anchorage of Hobart, extends from its sloping southern point N. by W. ¾ W. nearly 3 cables to the New Norfolk Steam-boat pier. From a depth of 4 fathoms 50 yards north-eastward of the southern point, the depths increase to 10 and 9 fathoms in the middle of the entrance, and thence decrease to 6 and 5 fathoms 100 yards S.E. of the pier. From the middle of the entrance, the cove extends about W. by S. a little more than 2 cables to the Melbourne and Sydney Steam-ship pier, on which is a *green* light for steam-vessels. From 9 and 10 fathoms in the middle of the entrance the depths decrease to 5 and 6 fathoms within 50 yards of the shore and wharves, over a bottom of mud.

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[*] Lieutenant F. W. Barrett, H.M.S. *Danäe*, 1881.

[†] Lieutenant J. St. C. Bower, H.M.S. *Danäe*, February 1881, remarks: "The time "ball gives the time only approximately, and should not be used for navigating "purposes."

From the southern point of Sullivan cove its south shore—behind which are the Ordnance stores—trends W. ½ N. 250 yards to New wharf, and may be approached within 50 yards in 4 and 3½ fathoms water. New wharf from its eastern end, extends W. ¾ S. 330 yards to the western corner of the cove: the middle portion of the wharf is accessible at low water to vessels of the greatest draught.

From the south-west corner of Sullivan cove to New Norfolk Steam-boat pier there is a continuation of wharves from which project four piers. There are generally 5 fathoms within 50 yards of these wharves, and 10 to 15 feet close to them. The Melbourne and Sydney Steam-ship pier, close off which is moored a coal hulk, projects into 6 fathoms, and another pier 200 yards to the north-eastward of it, into 5½ fathoms; 50 yards to the northward of the latter is Kangaroo steam-pier, which extends into 26 feet water.

New Norfolk Steam-boat pier, which forms the northern point of Sullivan cove, projects about 20 yards into 6 or 8 feet water: a bank with only 15 to 18 feet water on its outer edge, extends about 100 yards southward and 50 yards eastward from the end of the pier.

Close to the northward of New Norfolk Steam-boat pier is the mouth of Hobart rivulet, between which and Macquarie point, N. by E., a little more than 2 cables from the pier, there are only 12 feet water one cable from the shore, with irregular depths of 2½ to 5 fathoms between one and 1½ cables to the north-eastward of the pier.

Buoy.—A black, flat topped buoy is moored on the outer edge of a 2½ fathoms patch, with the extreme of New Norfolk Steam-boat pier bearing S.W. by W. distant one cable.

Macquarie Point, over which is Queen's battery, may be approached within 100 yards in 5 and 6 fathoms water, the ebb tide sets strongly around and towards the point.

The Domain.—From Macquarie point the river frontage of the Domain curves north-westward and northward nine-tenths of a mile to Pavilion point, and has a landing-place one cable, and a patent slip 3 cables from the former point. There are 3 fathoms water close to the landing-place; but a flat, with depths of 3½ to 4½ fathoms, extends above one cable from it.

For about one-third of a mile southward of Pavilion point, a bank, having 4 to 5 fathoms water on it, extends one-third of a mile from the shore. Between this bank and that which projects from the landing-place, to the northward of Macquarie point, there are regular depths of 6 to 9 fathoms. On the northern part of the Domain are the Government house, Observatory, and Botanical gardens.

Docks and Patent Slips.—There are three docks, or basins, the largest two being Constitution dock, which has an entrance at about 100 yards to the northward of Melbourne and Sydney Steam-ship pier; and a more shallow, but much larger basin to the north-eastward of it, having an entrance at about 50 yards to the northward of Kangaroo steam pier. Wet Dock in Sullivan cove belongs to the Colonial Government, and is adapted for vessels of 12 feet draught. Hobart has four patent slips. The largest slip, No. 1, under Prince Albert battery, is capable of taking a ship of 1,000 tons: one of 190 feet keel has been on it. Over the cradle there are 11 feet water at the inner, and 24 feet at the outer end.

The patent slip near Macquarie point, which is adapted for a vessel of 500 tons, projects 100 yards northward into 3 fathoms water, towards two buoys moored in 4 fathoms, on a bank with 3½ to 4 fathoms on it, extending 1½ cables from the shore; but to the eastward of the patent slip, and 2 cables to the northward of it, there are 5 fathoms water within 100 yards of the shore. The remaining two slips are also capable of hauling up vessels of about 500 tons.

Supplies.—Stores of all kinds, provisions, fruit, water, and fire-wood, are easily procured. The country in the immediate neighbourhood is rich in natural productions, such as coal, iron, black-lead, alum, mica, precious stones, and gums.

In the vicinity of D'Entrecasteaux channel and Huon river the trees are lofty, straight, and hard, and are used for the keels of the largest ships built in the colony; they are the largest species in Australasia, of the *Eucalypti*; other woods are used for ornamental purposes, particularly the Huon pine, which somewhat resembles satin wood.

Risdon Ferry.—From Pavilion point Derwent river trends north-westward 3 miles to Risdon ferry, and varies in width from one to one-third of a mile, with depths of 12 to 6 fathoms. The shores are bold, with several inlets, those most worthy of notice on the south-western side, being Newton and Prince of Wales bays, the former, which has 2½ fathoms water in its entrance, is distant 1½ miles, and the latter 2⅝ miles from Pavilion point. On the north-eastern side, three-quarters of a mile N.N.E. of Pavilion point, an inlet trends half a mile to the northward; and N.W. 2½ miles from the inlet is Risdon cove, at the south point of which is the ferry.

From Risdon cove Derwent river extends north-westward 2½ miles to a narrow point projecting one mile from the western shore, the intermediate portion of the river being nearly 2 miles wide, and forming an extensive bay on the south-west side. There are 5½ to 3½ fathoms water in mid-channel.

Bridgewater.—Between the eastern shore, and the point which projects from the opposite side, the river is contracted to a quarter of a mile in width, and turning thence about one mile to the westward, it trends N.W. by N. 1¾ miles to Jordan river, which flows into Derwent river from the northward. Between the mouth of Jordan river, and Bridgewater 1¾ miles to the north-westward of it, and for about 2 miles to the westward of the bridge, Derwent river is nearly half a mile wide, above which it is much smaller, with branches flowing into it, mostly from the northward and north-westward.

Bridgewater is 12 miles from Hobart on the north side of the Derwent, which is here crossed by a causeway and bridge. The main line railway also crosses here, a drawbridge is maintained for the convenience of navigation. There is a telegraph station here.

Mount Dromedary.—The land on either side of the Derwent river consists of hills and fertile valleys, with numerous small streams flowing into the river. The principal summits of these ridges above Hobart, are mounts Direction, Faulkner, and Dromedary, which bear respectively N. by E. ¾ E. 7 miles, N.W. by N. 5 miles, and N.W. ¾ N. 13 to 16 miles from mount Wellington. Mount Direction is 1,468 feet, and mount Dromedary 3,245 feet high. Mount Direction has a shoulder and sharp fall on the west side.

TIDES.—It is high water, full and change, in Derwent river, at 8 h. 15 m.; springs rise 4½ feet, and neaps 3½ feet. Tides here are irregular, and frequently for days, almost stationary. The flood stream is barely perceptible between Iron Pot islet and Kelly point, but it runs stronger under mount Louis, and thence parallel to the shore; it then follows the course of the river at the rate of half a knot. Between Macquarie and Montagu points the ebb runs South 1½ knots at half tide; off Battery point it runs S. by E., sweeping south-eastward round Sandy bay, at the rate of three-quarters of a knot, and after passing Sandy point, its strength is gradually reduced to half a knot towards the entrance of the river.

Winds.—During summer, or from December to March, the winds are generally land and sea breezes, which blow from N.N.W. and S.S.E., but with no degree of certainty, for frequently sudden changes take place in the middle of a fine sea breeze, by violent gales from the westward, which usually last three or four days. During winter it blows almost one continued gale. A great quantity of rain falls during the year.

RALPH BAY, which is separated from the eastern side of Derwent river by the North and South arms already noticed, extends 7½ miles in nearly a parallel direction with the river, and 1½ to 3½ miles East and

West. The entrance of the bay between Jane and Trywork points, is 1¼ miles wide with 7 to 14 fathoms water, but within the entrance the water is mostly shallow. Mortimer bay is an indentation of the eastern shore of Ralph bay, between 2 and 3 miles E.S.E. of Jane point. From Maria point, the north-western extreme of Mortimer bay, the eastern shore of Ralph bay trends northward 3½ miles to the foot of mount Mather, which is 571 feet high. Between mount Mather and the north shore of Ralph bay, a creek half a mile wide at its entrance, trends about 1½ miles to the eastward and southward; but this and Mortimer bay are both very shallow.

Hope Beach forms a slight curve extending from cape Direction nearly N.E. by E. 3 miles to Goat bluff, on which there is a hillock. This beach, which is low and narrow, is the only barrier between the south shore of Ralph bay and the sea.

BETSY ISLE and Rocks.—Betsy isle is 1¼ miles long, N.W. by N. and S.E. by S., half a mile broad, and is high and wooded, but only accessible towards its north-western end; the south point of Betsy isle lies E. ½ N. 3 miles from Iron Pot islet. A spit projects from the north extreme of the isle, between which and Goat bluff are two flat rocks, with 5½ and 6 fathoms North and South of them; S.W. one-third of a mile from the south point of Betsy isle is a small islet, between one and 4 cables to the south-eastward of which is a dangerous rocky reef. There are 7 fathoms water between the southern point of Betsy isle and the islet, and also between the islet and the reef. In heavy weather, the sea breaks within half a mile of the reef, where there are 5 to 16 fathoms water. There are regular soundings in 11 to 14 fathoms water, between the entrance of Derwent river and Betsy isle, with 6 and 7 fathoms close to the sides of the island, and within half a mile of Hope beach.

The coast from Goat bluff curves N.E. ½ N. 1¾ miles to cape Contrariety, and thence N.E. by N. 2 miles to cape Deslaco, which forms the west entrance point of North, or Frederick Henry bay. There are 9 fathoms water at half a mile southward of cape Deslaco.

STORM BAY,* the western shore of which is formed by the coast of Bruny island, from cape Frederick Henry to the entrance of Derwent river, and the northern shore by the coast from cape Direction to cape Deslaco, the bay is 15 miles wide E. by N. ½ N. from cape Frederick Henry, to cape Raoul the south point of Tasman peninsula, and extends from its entrance 15 miles northward to cape Deslaco.

Soundings.—From 50 fathoms close outside some dry and covered rocks, which extend about one mile from cape Raoul, the depth of water across Storm bay gradually decreases towards Bruny island, over a bottom of fine red sand, with black specks and small broken shells. From 35 fathoms in the middle of Storm bay, the water shoals gradually to 25, 16, and 12 fathoms towards Betsy isle. In crossing towards the entrance of Derwent river the bottom becomes muddy, which is generally the case where there is any considerable run of fresh water.

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* *See* Admiralty chart Tasmania, No. 1,079; scale, $m = 0 \cdot 11$ of an inch.

DIRECTIONS.—Vessels from the eastward, after rounding cape Pillar and cape Raoul, should stand over towards cape Frederick Henry, and steer thence along the north-eastern coast of Bruny island for the entrance of Derwent river. In working against a north-west wind, work up along the same shore, to avoid the strong outset from North bay.

If, when off Betsy isle, the wind should come on to blow from N.W., so as to prevent a vessel from working into Derwent river, she may obtain good anchorage either in Adventure bay or North bay. In calms or light winds vessels may, if necessary, anchor with a stream or kedge in Storm bay until they get a breeze.

Vessels bound to sea from Derwent river, and meeting a south-easterly gale in Storm bay, may find safe anchorage in North-west bay, just within the northern entrance of D'Entrecasteaux channel.

Winds.—During great part of the summer season, from November to April, when the weather is fine and settled, sea and land breezes generally prevail, the land breeze coming off between 8 and 10 o'clock; both these breezes are preceded by an interval of calms or light airs for two or three hours. From January to March the north-west winds come in very hard squalls.

CAPE RAOUL, the south point of Tasmania, is formed of high basaltic columns projecting 2 miles from the coast line. Its south-east point is bordered by a reef, and a cluster of dry and covered rocks extends about a mile from the south-west extreme of the cape.* From cape Raoul the hilly eastern shore of Storm bay consists of a succession of small bays and points extending 7 miles in a north-westerly direction to the southern point of Quoin or Wedge bay. Quoin isle, which lies half a mile off this point, is three-quarters of a mile long, North and South, and one-third of a mile broad, with some rocks close off its two ends. The isle is of a dull reddish brown colour, and at the north end or shoulder of the quoin about 60 feet high.

Quoin or Wedge Bay.—The entrance of Quoin bay extends from its southern point N. ¾ W. 2 miles to Norfolk head, with depths of 7 to 11 fathoms; from its entrance the bay trends 2 miles eastward, where it terminates in a shallow bight about one mile wide, with two small islets lying between one and 2 cables from its northern shore; close behind the low sandy eastern shore of this bight there are two lagoons. Quoin bay is shallow, and exposed to westerly winds.†

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* Two of the rocks off cape Raoul were seen at 2½ miles distance, they were probably 5 feet above water.—Remark Book, Lieutenant F. W. Barrett, H.M.S. *Danäe*, 1881.

† *See* Admiralty plan of Burnett harbour, No. 1,083; scale, *m* = 2 inches.

Burnett Harbour or Parsons Bay is a considerable inlet on the north side of Quoin bay, having an entrance a quarter of a mile wide situated N.N.E. 2 miles from Quoin isle, each point of the entrance being bordered by a narrow shoal. From its entrance Burnett harbour extends N.E 1½ miles, and thence S.E. about the same distance. The former trend of the harbour is a quarter of a mile to 3 cables wide, with 12 to 9 and 6 fathoms water, and with long kelp about the entrance points and near the shore on either side. There is a small inlet on the north-west side of the harbour at two-thirds of a mile within the entrance.

The south-eastern, or inner trend of Burnett harbour, although wider, is more shallow than the outer one, with depths decreasing from 9 to 1½ fathoms at one-third of a mile from the southern extreme of the harbour over a bottom of stiff mud. The south-western shore of the inner part of the harbour is divided into two shallow bights by a point projecting to within one-third of a mile of the opposite shore; there are also two shoal bights in the northern part of the harbour, fronted by a sand and mud-flat, having one to 3 feet water on it.

Although Quoin bay and Burnett harbour are small, yet from their position opposite Derwent river, they may be often found convenient for small vessels when adverse winds prevent their entering that river. Fresh water may be procured, but with some difficulty.

From the west point of Roaring Beach bay, at 1½ miles to the westward of Norfolk head, the eastern shore of Storm bay trends N.W. by W. one mile to North head, and thence N. by W. ¼ W. 4¼ miles to North-west head, the eastern entrance point of North, or Frederick Henry bay. At a distance of 1¾ miles N. by E. ¾ E. from North head, is mount Communication, 1,131 feet high.

NORTH or FREDERICK HENRY BAY is nearly 3½ miles wide W. ¼ N. and E. ¼ S., at its entrance, between cape Deslaco and North-west head, whence it extends northward 9 miles to the entrance of Pitt water, and is 6 miles wide. At a distance of 1¾ miles, N.N.W. from cape Deslaco is the mouth of Pipe-clay lagoon, whence the shore sweeps round north-westward 3½ miles to the low sandy isthmus between Ralph and Frederick Henry bays; hence to the northward about 3 miles to the foot of Single hill, between which, and the entrance of Pitt water N.E. ¼ E. 4½ miles from it, is a curved sandy beach.

North-west Point.—Between North-west head, and North-west point N. by E. ¼ E. 4½ miles from it, the south-east extreme of North bay recedes into a bight nearly 2 miles deep, its eastern shore being known as Sloping beach. North-west point, which forms the south-eastern side of the entrance of Norfolk bay, rises to a ridge, which is nearly separated from the land to the south-eastward by a lagoon.

Sloping Isle, which lies S.W. 1¼ miles from North-west point, is one mile long, North and South, with a reef of rocks extending from its south extreme, and Hog islet lying between its northern end and North-west point.

Renard Point, N. by W. 2¼ miles from North-west point, forms the north-western side of the entrance of Norfolk bay; between Renard point, and a small elevated peninsula W.N.W. 2 miles from it, is a small bight, off which lies Doughboy islet, bearing W.S.W., distant 1½ miles from Renard point. On the north side of the small peninsula is Carlton river, which is about 300 yards wide at the entrance, with a small islet close within it. Between Carlton river and the entrance of Pitt water the land projects to a point, at half a mile to the southward of which is Spectacle islet, bearing N. ½ E., distant 7 or 8 miles from cape Deslaco. A sunken patch lies S.S.E. 2 miles from Spectacle islet.

Pitt Water has a narrow entrance, with a depth of 2 fathoms in it, whence this lagoon extends nearly 9 miles in a westerly direction; within the entrance a narrow channel trends westward between two rocks, above which it passes close to a projecting head on the north side, and a point extending from the southern shore. There are 3 fathoms water between the two rocks, and 6 and 5 fathoms in the channel to the eastward and westward of them.

NORFOLK BAY is a commodious harbour, where a large fleet may find sheltered anchorage in 9 to 4 fathoms, on good bottom, within the entrance, which is 2 miles wide, with 5 to 16 fathoms water; the bay extends 9 miles, North and South, and is 3 to 5 miles wide, with soundings in 9 to 4 fathoms in the western, and greater portion of the bay.

From North-west point, the western shore of Norfolk bay extends E. by S. ¼ S. 2½ miles to Pig-face point, and thence S.E. by S. one mile to Ironstone point, from which it trends S. by W. ¼ W. 2½ miles to a small bight, whence the southern shore, consisting of a succession of deep bights and prominent points, curves 6 miles in an easterly direction to the south-west point of Little Norfolk bay. Those parts apparently most worthy of notice being Salt-water river, Half-way bluff, Impression bay, and the Cascades, which lie respectively S. ¼ E. 3 miles, S.S.E. ½ E. 3¾ miles, S.S.E. ½ E. 5 miles, and S.E. ¼ E. 6½ miles from Ironstone point.

Little Norfolk and Eagle Hawk Bays.—Between the western point of Little Norfolk bay, and One Tree point 1½ miles to the northward of it, is an opening divided into two channels by Woody isle, which lies N. by E. two-thirds of a mile from the former point. The southern of these two channels leads into Little Norfolk bay, and the other into Eagle Hawk bay; the first trending S.S.E. 2 miles, and the other

E.N.E. 3½ miles from Woody isle. Eagle Hawk bay forms a narrow channel, reaching within 2 cables of the beach of Monge, or Pirate bay, on the east coast of Tasmania. Eagle Hawk neck, the isthmus thus formed, connects Tasman peninsula with Forestiers peninsula to the northward of it.

The eastern shore of Norfolk bay, between One Tree point, and the south-eastern point of Flinders bay N.W. by N. 1½ miles from it, is divided into two small bights by a hilly projection, with some dry and covered rocks off and between it and One Tree point. Flinders bay is a double bight 1¼ miles wide from S.E. to N.W., and is separated from King George sound to the northward of it, by a peninsula about one mile in extent.

King George Sound is half a mile wide at its entrance, between the small peninsula, and King George isle to the northward of it, whence the sound trends about 2¼ miles in a north-easterly direction, with two small bays on its south-east side and an islet in its northern corner. King George isle, which is about one-third of a mile in extent, lies half a mile south-westward of a point, between which and a peninsular projection at three-quarters of a mile to 1½ miles north-westward of the island, is a double bay three-quarters of a mile wide and half a mile deep.

Garden Isle, which lies nearly midway between the double bay and Pig-face point, is nearly one mile long, North and South, and half a mile broad. There are 4 to 7 fathoms water between Garden isle, and Ironstone point to the south-westward of it; and a 2½ fathoms shoal between the isle and the peninsular projection to the north-eastward of it.

East Bay Neck.—Between this peninsular projection, and a point N.W. ½ W. 1¾ miles from it, is a shallow bay, separated from port Frederik Hendrik, to the north-eastward, by East Bay neck the isthmus which connects Forestiers peninsula with the mainland of Tasmania. Green isle, which lies S.S.E. three-quarters of a mile from the north-west point of this bay, is 2 cables in extent.

The Northern Shore of Norfolk bay, from Renard point, trends irregularly in an E. by N. direction 4¾ miles to the north-west point of the shallow bay just described.

TASMAN PENINSULA, of which the south-western and northern coast have been already described with the shores of Storm, North, and Norfolk bays, extends N.W. ½ W. and S.E. ½ E. 23 miles, and 13 miles across; it consists of wooded hills and fertile valleys, with numerous streams of pure fresh water.

CAPE PILLAR, the south-east extreme of Tasman peninsula, lies E. by N. ½ N. 9 miles from cape Raoul, and is the most remarkable headland on the coast, being formed of perpendicular columns of basalt rising to a great height, and there forming a flat surface, the high land near the cape bearing mostly without wood.

Tasman Island, which lies close to the southward of cape Pillar, is rocky and sterile. There is a narrow passage between cape Pillar and the island, sometimes available for small vessels.

PORT ARTHUR.—The coast between capes Rauol and Pillar forms a bay, in which, midway between the two capes, is the entrance of port Arthur, one of the most secure harbours in Tasmania.*

The West Head of the entrance of port Arthur lies N.E. ¾ N. 4 miles from cape Raoul, and is the south-east point of a peninsula projecting nearly 2 miles from the line of coast, with a small cove, named Half-moon bay, between the head, and another point three-quarters of a mile to the northward of it. There are 40 fathoms water, 2 cables off West head; but Black rock, about one mile to the south-westward of the head, appears to be connected with it by a reef of rocks.

The entrance of port Arthur, between the northern point of Half-moon bay and the bold East head to the north-eastward of it, is nearly three-quarters of a mile wide, with 20 fathoms water within it. From the East head the steep eastern shore slightly curves in a N. by W. ½ W. direction 3 miles to the head of North-east bay, which is two-thirds of a mile wide, East and West, and fronted by a shoal.

Safety Cove.—The western shore of port Arthur forms three bays capable of affording sheltered anchorage for the largest ships. From the northern point of Half-moon bay the western shore trends N.W. ½ W. three-quarters of a mile to the south point of the entrance of Safety cove, which extends two-thirds of a mile, North and South, and half a mile, East and West, with 10 to 3 fathoms water.

Puer Point.—Safety cove is separated from Opossum bay to the northward of it, by Puer point, which from the cove extends about one mile to the north-eastward and northward; from the breadth of a quarter of a mile near Safety cove, the point gradually narrows to its north extreme, close off which is Dead islet.

From the entrance of port Arthur there are depths of 17 to 26 fathoms in mid-channel, and 8 to 12 fathoms close along the shores for 2 miles up to the north extreme of Puer point, the bottom being sand.

Opossum Bay and Stewart Harbour.—Opossum bay is half a mile wide, N.W. and S.E., at its entrance between Puer point and the southern point of Stewart harbour, to the north-westward of it. From its entrance Opossum bay extends about a mile to the southward, the southern shore being fronted by a sand and mud-flat, but in the outer portion of the bay there are 13 to 5 fathoms, with deep water on the north-west side of the bay.*

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* *See* Admiralty plan of port Arthur, No. 1,083; scale, *m*=2 inches.

Stewart harbour is at the entrance, one-third of a mile wide, N. by E. ½ E. and S. by W. ½ W., between Erskine point, the northern point of Opossum bay, and Osborn point, the western extreme of North-east bay, one-third of a mile to the north-eastward of it, and a third of a mile deep. A tramway extends from Stewart harbour N. by W. 3 miles to Little Norfolk bay.

This harbour and the north-western portion of Opossum bay form the water frontage of the settlement of port Arthur.

This harbour is situated within an amphitheatre of lofty wooded hills, the land about the settlement being very fertile, well watered, and of a most pleasing aspect.

Supplies.—There is excellent timber about port Arthur, amongst which may be enumerated great quantities of gum, stringy bark, light wood, and sassafras. Water is abundant, nearly all the bays having small streams of fresh water flowing into them.

TIDES.—It is high water, full and change, in port Arthur, at 7h. 52m.; springs rise 4 feet.

EAST COAST OF TASMANIA.

The EAST COAST of TASMANIA from cape Pillar curves 5 miles in a N. by W. ¼ W. direction to cape Hauy, which has a cluster of rocks close off it, and forms the southern point of Dolomieu, or Fortescue bay.†

Hippolite Rocks are situated immediately in front of Dolomieu bay, between E.N.E. and N.E. by N. one to 2½ miles from cape Hauy; they consist of two rocks above water and covered patches, the eastern and most elevated rock being 70 feet high, of a reddish brown colour, and quoin shaped, high at the west end. There are 50 fathoms water between the Hippolite rocks.

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* H.M.S. *Nelson*, anchored at Opossum bay in March, 1883, with the north point of Dead island bearing N. 87° E., and point Erskine N. 13° W.—Staff Commander J. R. Osborn.

† The rocks off cape Hauy are conspicuous, and being detached show as pillars apparently 70 feet high.—Remark Book, Lieutenant F. W. Barret, H.M.S. *Dande*, 1881.

Dolomieu Bay is 1½ miles, wide N.W. and S.E., and 1½ miles deep, with a white sandy beach; the bay is sheltered only with land winds, the Hippolite rocks not being sufficient to protect it from seaward.

MONGE, or PIRATE BAY.—From Dolomieu bay the coast trends nearly N.N.W. ½ W. 6 miles to the south-eastern point of Monge bay, between one and 3 cables to the north-westward of which is the isle of Fossils connected with the shore by a reef of dry and sunken rocks. From its south-eastern point Monge bay extends N.N.W. ½ W. 1½ miles to its north-western point, close off which lie the two Clyde islets. This bay is three-quarters of a mile deep, with a small sandy beach in its southern bight, and a more extensive one along its western shore; the latter forms the narrow isthmus which connects Tasman peninsula with Forestier peninsula, to the northward of it. On the north-western shore of Monge bay is an extensive level of basaltic rock, much resembling a pavement of large flat stones, laid with remarkable regularity between straight parallel lines.

From Monge bay the coast extends 2 miles in a N.N.E. ½ E. direction to cape Surville; a small islet lies close to a point three-quarters of a mile north-eastward of the north-eastern point of Monge bay; and half a mile to the south-eastward of cape Surville, Sisters islets lie within half a mile of a projection of the coast. Immediately behind a bay midway between Eagle Hawk neck and cape Surville, mount MacGregor rises to the height of 1,943 feet.

Between cape Surville, and a projection N. by W. 1½ miles from it, is a bay half a mile deep, having two small islets or rocks, one close within the cape, and the other near the shore midway between the two points of the bay. From the northern point of this bay the coast extends N. by W. 2 miles to Yellow bluff, and thence N.W. by N. the same distance to Humper bluff. The coast is high and bordered with rocks above and under water, and affords neither anchorage nor shelter, as the sea breaks upon every part of it with violence.

Wilmot Cove is the western end of an inlet trending W.S.W. 1½ miles from its entrance, between Humper bluff, and cape Frederik Hendrik N. by W. two-thirds of a mile from it. The southern shore of this inlet is fronted by several rocks, and small islets, the largest and most distant from the shore being the Kelly islets, which lie midway between Humper bluff and Wilmot cove; some rocks also extend south-eastward from the extremity of cape Frederik Hendrik.

CAPE FREDERIK HENDRIK is a narrow point stretching 1½ miles in a N.E. by E. ½ E. direction from the line of coast, and forms the south-eastern point of Marion bay.

MARION BAY is an exposed indentation of the coast, extending from cape Frederick Hendrik N.N.W. 8½ miles to cape Bernier, and is

4 miles deep, but the only part at all available for vessels is in the southern portion of the bay.

North Bay, which forms the southern portion of Marion bay, extends from cape Frederik Hendrik N.W. by W. 3 miles to cape Paul Lamanon, and is 1¼ miles deep, with a small inlet W.S.W. 2 miles from the extremity of the former cape. Green islet, which lies in front of the bay, N. by W., 1¼ miles from cape Frederik Hendrik, is too small to afford any protection from seaward.

Cape Paul Lamanon is a small projecting point, with High rocks and others above and under water, close to it. From this cape the coast trends westward one mile to the north-eastern entrance point of port Frederik Hendrik, and is bordered by a reef of rocks.

Port Frederik Hendrik is an extensive but shoal inlet on the south-western side of Marion bay, the south-west side of its confined entrance being formed by a narrow point which projects S.E. by S. 2 miles from the western, to within one-third of a mile of the opposite shore. This port is nearly of a triangular form, extending from its entrance S.W. by S. 4½ miles to within about a quarter of a mile of the north-eastern shore of Norfolk bay, and is 3 miles wide from S.E. to N.W. The shores are high, and form a projecting double point on the east side, and two long narrow projections on the west side.

M. Freycinet, the French navigator, says:—"The breakers which are at the entrance of port Frederik Hendrik, appear to render the channel difficult; it has, however, not less than 3 fathoms water, and by ranging tolerably close to the reef off the outer point, and then closing the eastern shore, deeper and smoother water will be found. This part can be useful to vessels of small tonnage only, the soundings being irregular and everywhere shallow. In the south part, where they appear to be deepest, we had only 3 fathoms, and the port is otherwise obstructed by extensive banks, which dry at low water. A single rivulet of fresh water was found in the south-east part of the port; but a boat cannot approach within a mile of it. The many dry torrent beds, however, show that there is no want of water in the rainy season. The country is of the same description as that in D'Entrecasteaux channel."

Supplies.—Wood can be had here, and plenty of fish may be taken on the large bank at the entrance.

TIDES.—It was not possible to make any correct observations of the tides, but they rise about 4 feet, and produce a current at the entrance, of about 2 knots.

The COAST.—From the entrance of port Frederik Hendrik a flat sandy beach curves N. ¾ W. 5 miles to Du Ressac point: landing is at all times dangerous on this beach, and is impossible with winds from the sea, as an enormous surf breaks more than 2 cables from it. A mountain torrent pours through this beach in the rainy season.

Between Du Bessac point and cape Bernier the coast, which is of moderate height, forms two sandy bights that may be approached with off shore winds, when that nearest the cape will be found the most convenient.

Cape Bernier is high and remarkable on account of its conical shape; there are 6 and 7 fathoms water close to the southward and eastward of it.

MARIA ISLAND is separated from the east coast of Tasmania by a navigable channel 2½ to 4½ miles wide; cape Peron, its south point, lying East 3½ miles from cape Bernier. Cape Peron is a bold headland with three rocks situated off it. The one nearest the cape, from which it is separated by only 20 yards, is called Pyramid Rock, and is 118 feet high; the outer rock, which is known to the fishermen as the "Boy in the Boat," is a small dangerous pinnacle, steep to and only 2 feet above high water, and lies S.S.W. ½ W. 4 cables from cape Peron, while the middle of the three is 6 feet high, and situated about midway between the other two. Maria island is 11 miles long, north and south, and at 5 miles N. by E. ½ E. from cape Peron, is nearly divided by Riedlé bay on the east, and Oyster bay on the west side, there being only a low sandy isthmus between them. The southern part of the island is 3½ miles, and the northern 6½ miles broad.

From cape Peron the southern coast of Maria island trends N.E. by E. 3 miles to cape Mourouard, on the south-west side of which is a small inlet. From this cape the coast trends irregularly, one mile north-eastward to cape Bald, and thence N.N.W. ½ W. 2½ miles to the south-western point of Riedlé bay. There are 10 fathoms water close to cape Bald; but some rocks lie near the shore 1½ miles to the northward of the cape.

The south and east coasts of Maria island are all of granite, and rise abruptly, like a wall, to the height of 200 feet, but gradually descend from cape Mourouard toward Riedlé bay. There are some caves in which the water breaks with a great noise.

Riedlé Bay extends nearly 2 miles across from S.W. to N.E., and is one mile deep, with some rocks projecting from its western and northern shores. There are 15 to 9 fathoms, fine sand, in the south-western part of the bay, but in the north-eastern part there are only 5 or 6 fathoms. Riedlé bay affords but indifferent anchorage for vessels remaining any length of time, being entirely exposed to the wind and sea from South to N.E. Landing may be effected at the south-western part of the bay, with the wind off the land, but farther to the northward, the approach to the shore is prevented by a dangerous bar.

From cape Mistaken, which lies E. by N. 1½ miles from the north-eastern point of Riedlé bay, the eastern coast of Maria island trends N.N.E. ½ E. 1½ miles to Ragged head, with a small islet or rock close to the east side of the cape. The coast from Ragged head extends N.W. ½ N. 5 miles to cape Boullanger, with a small inlet midway, and some rocks near the shore 2 miles to the north-westward of the head. The land rises from this high steep coast to a lofty ridge, mount Maria, W.N.W. 3 miles from Ragged head, being 2,329 feet, and Bishop and Clerk mount, 1¼ miles south-eastward of cape Boullanger, being 3,000 feet high.*

There are 19 fathoms water about one mile from the shore between capes Mistaken and Boullanger.

From cape Boullanger the northern end of Maria island forms a bay extending W. ½ N. 2 miles to the north point of the island, half a mile off which is North islet, with Black, and other rocks between it and the shore to the south-eastward of the islet.

The western coast of Maria island from cape Peron, trends N.N.W. 1½ miles, and thence N. by E. ½ E. 3 miles to the south-east point of Oyster bay. There are 3½ to 4 fathoms water along this coast, but the point is enclosed by a shoal.

Oyster Bay is 1¼ miles wide from S.E. to N.W., at its entrance, within which the bay expands to 2¼ miles, and is 1¼ miles deep, but its shores are bordered by a shallow flat: the greatest depth of water in the bay is not more than 3½ fathoms, and it generally does not exceed 2 or 3 fathoms, with a white sandy bottom.

The northern side of the entrance of Oyster bay is formed by a low narrow point, projecting south-westward nearly 1½ miles from the coast-line, from the extremity of which the western coast of Maria island extends N. by E. ½ E. 6 miles to its north point, and forms a succession of small bights and points, bordered by a shoal, on which are some sunken rocks.

The north-western part of Maria island from Oyster bay to North islet, is low and wooded.

Settlement.—Immediately on the south-west side of the north point of Maria island there is a small cove, close to which is the Settlement.

Productions.—The soil of Maria island is excellent, and deep in the valleys. Oysters, lobsters, and mussels are abundant, and the former of an extraordinary size; but other kinds of fish are scarce, particularly in the beginning of winter.

Winds.—Whilst at anchor abreast of Oyster bay, M. Freycinet found the winds to blow from all points of the compass; those from N.N.E. to S.S.E. being the most constant, and from S.S.W. the strongest; and he had often rain and fog, without being able to observe if they were dependent or not on the direction of the prevalent winds.

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* The Bishop and Clerk did not show as a conspicuous mark.—Remark Book Lieutenant F. W. Barrett, H.M.S. *Dandé*, 1881.

The COAST from cape Bernier, extends northward 3½ miles to Galet point, and is steep, with 6 or 7 fathoms water close to. Cockle bay is merely a slight indentation of the coast, terminating to the southward in a small inlet, on the west side of Pebbly point, which lies 2 miles to the northward of cape Bernier.

From Galet point the coast trends north-westward nearly 2½ miles to the head of a small inlet formed on its north-east side, by a low narrow point stretching out about one mile south-eastward from the coast-line. This point is fronted by a sandy beach, and a small stream flows into the inlet.

Lachlan Islet, which lies E.N.E. one mile from this point, is of triangular form, 1½ cables broad, 43 feet high and covered with grass. The only conspicuous object on it is a solitary bush which is nearly in the centre. There is a small reef of rocks 1½ cables to the north-westward of Lachlan islet, the highest point of which is one foot above high water.

The channel westward of Lachlan islet has not more than 12 feet water in it, and none but small vessels should attempt it.

Between the low narrow point, abreast of this islet, and a steep cape N. by W. 2½ miles from the point, the coast is slightly embayed, with 5½ fathoms water about a mile from the shore. From this cape a high rocky coast extends 3 miles N.W. ½ W. to the southern point of the entrance of Prosser bay. A range of mountains extends from S. by W. to N. by E. behind the coast from port Frederik Hendrik to Prosser bay, its principal summits being Gordon Sugar-loaf, 1,350 feet high, and Prosser Sugar-loaf, 2,195 feet high, the former bearing S.W. by W. ½ W., distant 8½ miles, and the latter W.N.W. 6 miles from cape Bernier. Thumbs, 1,807 feet high, the northernmost summit of this range, is situated about 3½ miles to the south-westward of Prosser bay.

Between the steep rocky cape just noticed, and a projecting point 2½ miles to the northward of it, is a deep bay extending 2 miles north-westward to a broad point, which separates Prosser bay from Spring bay to the north-eastward.

Orford Road is a fair anchorage during the westerly gales so prevalent on all the coasts of Tasmania, but cannot be recommended in easterly gales, as the bottom is of hard sand, and a swell rolls in round the north end of Maria Island.

Prosser Bay is about 1½ miles in extent, but it is shallow, and useless for any but very small vessels. A vessel may anchor off its entrance, but would not be sheltered from the southerly winds, which are so violent in this locality. In easterly gales there is said to be a dangerous sea in this bay.

Prosser river discharges itself into Prosser bay. On its right bank is situated the hamlet of Orford, which contains sixty people (1884). The

The COAST.—From cape Bougainville the coast curves in a N. by W. direction 5½ miles to the south-east point of Grindstone bay. Between one and 2½ miles northward of the cape there are two small inlets, close off which are some sunken rocks; but there are 17 to 24 fathoms one to 2 miles from the shore between the cape and the bay.

Cape Bailly.—From Grindstone bay, which is a small inlet trending to the westward, the coast trends N.W. 2 miles, and thence N.N.E. 4 miles to cape Bailly, on the southern side of which are some rocks above water, with 10 fathoms close outside them, and 16 to 14 fathoms between Grindstone bay and the cape. The land from cape Bougainville to cape Bailly is less elevated, but still steep and wooded like that to the southward.

Ile des Phoques, E. by N. 7 miles from Grindstone bay, is a sterile rock from 400 to 600 yards in extent; there are 12 fathoms water close to the southward of it, and 26 to 24 fathoms between it and the shore.

SCHOUTEN ISLAND, which forms the east side of the entrance of Fleurieu or Oyster bay, is 4½ miles long, East and West, and one to 2 miles broad, with cape Faure, its south-west extreme, bearing E.N.E., distant 9½ miles from cape Bailly. Cape Sonnerat, the south extreme of the island, which lies E. by S. 3 miles from cape Faure, has groups of islets and rocks extending 2 miles to the southward, the southernmost being the Taillefer islets; an islet also lies one mile off the north-west extreme of Schouten island.

Water.—There is a small stream of excellent water on the southern part of Schouten island, where a boat may easily land; and the inlet at the eastern end of the island may possibly afford a landing-place.

Géographe Strait, which separates Schouten island, from the south point of Freycinet peninsula to the northward of it, is about half a mile across at its narrowest part, with apparently no other detached danger than a small rock above water, close off the south point of the peninsula.

FREYCINET PENINSULA extends 6 miles, North and South, and 3½ miles across its broadest part, whence it gradually narrows to its south point. The east side of the peninsula from its south point, trends nearly N. by E. ¼ E. 6 miles to its north-east point, whence the northern end turns West and S.W. 2½ miles to the isthmus which connects this with another peninsula to the northward of it. The eastern side is partly bordered with rocks, and the south-west and north-west sides are slightly indented.

The Isthmus which connects Freycinet peninsula with a smaller one to the northward of it, is 1½ miles long, N.W. and S.E. and half a mile broad, the greater portion of it being occupied by a pond of fresh water supplied by the rains; it is separated from the bay on its western side, by a barrier of sand about 50 yards broad; the other part of the isthmus is tolerably well wooded.

The peninsula to the northward of this isthmus extends 4 miles East and West, the isthmus which connects it with the land farther North, being one mile broad.

Thouin and Sleepy Bays.—Thouin bay, on the east side of the southern isthmus, is one mile broad North and South, half a mile deep; but exposed to the eastward. From the northern point of this bay the east side of the northern peninsula trends N. by W. 2½ miles to the head of Sleepy bay, a small bight on the south side of cape Tourville.

CAPE TOURVILLE.—This cape projects about half a mile to the south-eastward, with a cluster of small islets or rocks extending from it about one mile to the north-eastward; these, together with the cape, probably protect Sleepy bay from the northward, although it must be fully exposed to the southward and eastward.

Aspect.—Freycinet peninsula about 2,000 feet high, and Schouten island also high, are steep, and sterile towards the sea, but low and wooded on the western side; cape Tourville being also high, these alternate mountains and isthmuses give this part of the coast from seaward, the appearance of a chain of islands.

FLEURIEU or OYSTER BAY is formed on the east side by Schouten island and the peninsulas to the northward of it; and on the west side by the coast extending northward from cape Bailly. This bay is 9½ miles wide at its entrance, whence it extends North 14 miles to its low northern shore.

The West Shore of Fleurieu bay from cape Bailly, extends N.N.W. 2 miles, and then turns westward one mile to the entrance of Little Swan port. A rock above water, with 11 fathoms close to the northward of it, lies near the shore one mile to the northward of cape Bailly.

Little Swan Port does not appear to be more than one cable wide at its entrance, but the port extends thence 3 miles in a S.W. direction, with the width of a mile; it is, however, only fit for boats. There are two small islets in the western part of Little Swan port, between which and its northern shore is the mouth of Little Swan port river, an inconsiderable stream winding from the westward. Little Swan port mountain, 1,757 feet high, is situated S.W. by W. ½ W. 9 miles from cape Bailly.

From Little Swan port the western shore of Fleurieu bay extends N. by E. 3½ miles to Buxton point, and is intersected by two small streams, one at 1¼ miles, and the other at 2¾ miles northward of the entrance of the port. The coast from Buxton point, after turning about one mile to the north-westward, trends N.N.E. ½ E. 5½ miles to Webber point, between which, and Waterloo point N. by W. 2½ miles from it, the coast forms a slight indentation, with a small stream flowing into it one mile northward of Webber point, and an inlet close to the southward of Waterloo point.

About one mile north-westward of Waterloo point is the mouth of a small stream flowing from the south-westward, whence the northern shore of Fleurieu bay curves E. by N. ¾ N. 7 miles to the entrance of Great Swan port. For about 5 miles westward from this opening the shore forms the south side of a low tongue of land, which separates Fleurieu bay from Great Swan port.

Eastern Shores.—Refuge Islet.—The eastern shores of Fleurieu bay have already been described as far north as the isthmus between Freycinet peninsula and that to the northward of it, on the west side of which the bay affords good anchorage, sheltered by Refuge islet, which, with some rocks close to the southward, lies near the shore one mile from the north-western part of the isthmus.

Wood and Water may be procured with facility, the latter from the pond on the isthmus.

Hepburn Point.—The bay on the west side of the northern isthmus, abreast of Sleepy bay, is 1½ miles wide at its entrance between the west point of the northern peninsula, and Hepburn point to the northward of it, and is about 2 miles deep. Although there are several rocks in this bay, it is said to afford good anchorage. From Hepburn point the eastern shore of Fleurieu bay trends N.W. by N. 1½ miles to the entrance, of Great Swan port.

Soundings.—The French navigators did not sound the middle of Fleurieu bay; but there are 12 to 6 fathoms from one mile off Buxton point to close off Webber point, whence, to within half a mile of the northern shore, there are 7 to 5½ fathoms, with 4½ fathoms between the latter depth and the entrance of Great Swan port. From half a mile off the west point of the northern peninsula to the same distance off Hepburn point there are 7 to 4½ fathoms. Judging from these soundings, M. Freycinet was of opinion that there were many good anchorages in Fleurieu bay, although it is entirely open to the southward.

GREAT SWAN PORT.—From its entrance, which appears to be not more than one cable wide, Great Swan port trends westward 5 miles along the north side of the tongue of land before noticed, to the mouth of Swan river, which flows into the port from the northward and westward. The port, from its entrance increases westward to one mile in width.

Moulting Lagoon.—About 1½ miles north-eastward of the mouth of Swan river is a narrow opening communicating with Moulting lagoon, which extends thence 5 miles in a N.N.E. direction, forming, by a projection of the north-western shore, two basins, the south-western being 2½ miles, and the north-eastern 1½ miles in extent. There are several islets, or rocks, in this lagoon, and a small stream flows into the north-eastern basin from the northward.

The COAST.—The east coast of Tasmania from cape Tourville, extends 2 miles in a N. ¼ E. direction to the south-east point of Bluestone bay, receding thence half a mile to the westward, trends N.N.W. ½ W. 3 miles to a double headland, having on its west side a small inlet, and N.W. by N. 1¼ miles from this, is a larger opening. Between the latter, and Moulting lagoon 2 miles to the westward of it, the land rises to mount Peter.

CAPE LODI.—From the north-western of these two inlets the coast extends northward 7 miles to cape Lodi, 3 miles to the southward of which a point projects half a mile to the south-eastward from the line of coast. There are 14 fathoms water within a mile of the south-east point of Bluestone bay and 9 fathoms close off cape Lodi, with 8 to 5 fathoms near the shore between these points.

Peggy Point.—From cape Lodi the coast curves N. by W. 2¾ miles to Peggy point, close off which is a small islet. The coast from Peggy point forms a bay 2 miles deep, extending N. by W. ¼ W. 7½ miles to the south extreme of Long point. The shores of this bay are intersected by several inlets and small streams, the largest of the former being an opening with a small islet in it, N.W. 3½ miles from Peggy point. About midway between Peggy point and the opening, lies Diamond islet close to the shore.

LONG POINT is of a peninsular form, with its eastern face extending above a mile North and South, and forming a small bight on either side of the isthmus which connects it with the mainland to the westward of it. These little bays have jetties, with coal shoots for the convenience of coasting vessels.

Coal.—There are exports of coal, fire-clay, &c., from Long point; a seam of good coal having been opened, about half a mile from Long point, and worked by a company.

St. Patrick Head.—About one mile N.N.W. from Long point is an inlet with a narrow entrance, trending northward and southward parallel with the shore. From this inlet the coast extends 9¾ miles in a North direction to St. Patrick head, which, together with the shore for about 2 miles to the southward of it, is bordered by a reef. There are 10 fathoms water close to the northward of the reef, which projects but a short distance from the head in that direction.

Soundings.—From 10 miles eastward of cape Tourville to 7 miles north-eastward of Long point there are 66 to 40 fathoms, with similar depths about 5 miles from the shore; but immediately outside those soundings there is no bottom at 89 fathoms.

The COAST.—From St. Patrick head the coast trends W. by N. ½ N. 1½ miles, and thence N. by W. ¾ W. 3 miles to the entrance of a creek trending irregularly nearly 2 miles in a N.N.W. direction. About 2 miles further to the northward is the mouth of a small stream flowing from the northward and westward. From the mouth of this stream the coast extends N. ¼ E. 5 miles to the entrance of a creek having a small arm trending to the westward and a larger one to the southward; S.S.E. 2 miles from this creek lies Paddy islet, about half a mile from the shore. The coast consisting of a slightly curved sandy beach, next trends nearly N. by E. 6 miles to cape St. Helen.

Maurouard Isle, which lies South 5 miles from cape St. Helen, and a little more than a mile from the shore, is nearly three-quarters of a mile long, East and West, with a rocky reef extending from it to the southward. Some fresh water has been found on the island, and in case of absolute necessity, a vessel might anchor in 18 fathoms, between it and the shore. Between Maurouard isle and cape St. Helen there are 16, 11, and 5 fathoms water within half a mile from the shore.

Aspect.—From cape Tourville to cape Lodi the coast is rocky and barren, but towards St. Patrick head it appears to be well wooded, and, rising higher near cape St. Helen, presents several remarkable points of a pyramidal shape in the interior, the three most worthy of notice within 10 miles of the coast, being Lyne Sugar-loaf, 1,777 feet high, W. ½ S. 8 miles from cape Lodi; mount St. John, 2,550 feet high, S.W. by W. ¾ W. 10 miles from Long point; and mount Nicholas, 2,812 feet high, about 10 miles to the westward of St. Patrick head. There are more lofty mountains in the interior, St. Paul Dome, W. ½ S. 11 miles from mount St. John, being 3,368 feet, and Ben Lomond, about N.W. ½ W. 11 miles from the Dome, being 5,310 feet high.

CAPE ST. HELEN is the northern end of a long, and comparatively narrow tongue of land, with a continuous ridge of hills on it, extending in a N. by E. and N.N.E. direction to Bare Top hill, which at two-thirds of a mile within the north-east extreme of the point, rises to the height of 250 feet. The point from Bare Top hill to its north-east extreme is about three-quarters of a mile broad, and thickly fringed with rocks, none of which appear to extend beyond a cable from the shore, except from the south-east extreme of the point, whence a reef of rocks extends nearly 3 miles south-eastward from the shore: there are 60 fathoms a mile off the end of this reef, and 66 fathoms 4 miles farther to the eastward.*

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* *See* Admiralty chart, Tasmania, general No. 1,079; scale, m = 0·11 of an inch.

GEORGE BAY is an extensive harbour on the west side of the long tongue of land just noticed, with a wide deep approach from the sea, between cape St. Helen and Grant point to the north-westward of it.*

GRANT POINT.—Grant point, the outer north-western point of the entrance of George bay, is a rocky projection bearing N.N.W. ¾ W., distant 2 miles from Bare Top hill. The land rises from Grant point to the height of 1,203 feet at mount Pearson, which bears W. ½ N. distant 4½ miles from the point. Elephant rock, which lies N.E. by N. a quarter of a mile from Grant point, is the south-easternmost of a cluster of small islets and rocks, altogether not exceeding 2 cables in extent.

Entrance to George Bay.—From Grant point the shore trends S.S.E. nearly half a mile to the inner north-western point of the entrance, which is 1¼ miles wide, N.W. by W. and S.E. by E. between this point and the north-west extreme of cape St. Helen. There are 14 fathoms in mid-channel, with decreasing soundings to 7 and 9 fathoms a cable off the south-east side of the entrance, and 7 to 5 fathoms within 2 cables of the north-west side. From this line of soundings the depths decrease to 4 and 3 fathoms when Bare Top hill bears S.E. The shoalest water outside the bar, is within a quarter of a mile of the shore to the north-westward of Bare Top hill; but the depths quickly decrease to 9 and 8 feet upon the bar, which extends across the channel leading into George bay.

From the north extreme of cape St. Helen a very broken rocky shore extends nearly S.W. one mile, whence a low smooth shore trends West one-third of a mile to Blanche point, which lies W. ½ S. nearly one mile from Bare Top hill.

South Shoal, which has irregular depths of one to 5 feet water on it, extends nearly half way across from the south-eastern, to the opposite shore. From half a mile north-eastward of Blanche point the north-western edge of South shoal curves to 1¾ cables north-westward of the point. A bight, one cable wide, with 10 to 6 feet water, runs in south-westward between the north-eastern end of the shoal and the shore, and a spit, with two knolls to the northward, projects 150 yards from Blanche point.

Middle Shoal is a bank 200 to 150 yards broad, with 2 to 5 feet water, lying N.E. and S.W., nearly parallel with the north-western edge of South shoal, of which it may be considered to form the outer part, as it is only in the south-western end of the space between the two shoals that the water is one foot deeper than it is on Middle shoal itself. The north-eastern end of this shoal lies N.E. by N. 6 cables, and the south-western, N.N.W. 2 cables from Blanche point.

Granite Rock, Dora, and Clerk Points.—From the inner north-western point of the entrance the irregular rocky western shore extends S. ¾ W. a little over one mile to Granite Rock point, whence a more uniform shore trends S.W. ¾ S. nearly a quarter of a mile to Dora point, and then a quarter of a mile farther in the same direction to Clerk point, which lies West, one-third of a mile from Blanche point.

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* *See* Admiralty plan of George bay, No. 1,081; scale, m = 3 inches.

Beacons.—Leading beacons are placed on Granite Rock point.

North Shoal.—The shore for about one-third of a mile northward from Granite Rock point is fronted by North shoal, which has 2 to 4 feet water, and extends a quarter of a mile from the shore, terminating in a narrow irregular spit, with 4 and 5 feet water N.E. 4 cables from Granite Rock point.

Outer Bar.—The channel between North and Middle shoals, which is the principal passage into George bay, is about 120 to 270 yards wide, with only 8 and 9 feet water on the bar across its entrance. This bar appears to be permanent, as its state, when surveyed in 1862, by Lieutenant Brooker, agreed with Major Cotton's report and with earlier records. From the bar the depth of water increases to 4¾ fathoms in the channel one cable to the southward of Granite Rock point.

The Eastern Shore is low between Blanche point and Atkins point S. by W. ½ W. 1½ miles from it, and forms two bights, separated by Pelican point, a low sandy spit projecting 2 cables to the south-westward and southward. The northern bight is filled by shoals and sand-banks, with one to 8 feet water between them; and the southern bight is occupied by a sand and mud-flat. The outer edge of the former extends about 100 yards beyond the line between Blanche and Pelican points; and the outer edge of the sand and mud-flat recedes about 150 yards from the line between Pelican and Atkins points.

Horse-Shoe Bank, with one to 5 feet water, is a continuation of the South shoal, extending to one-third of a mile S.W. ½ S. from Blanche point, and appears to be the great obstacle to the navigation of George bay. From the sand-spit which projects from Blanche point, the eastern edge of Horse-shoe bank trends South and S.W. 4 cables to its south point, leaving an inlet with 1½ to 2½ fathoms between the bank and the shoal fronting the eastern shore, which inlet extends to within 100 yards of Blanche point. From its south point the western edge of Horse-shoe bank sweeps round north-westward and northward 4 cables to its north-west spit, which has a beacon on it, and 6 feet water.

Inner Bar.—The channel from Dora point is uncertain; sometimes it takes a former direction, known as Glover channel, at others by the western shore, and when surveyed in 1862, it passed between the north-west spit of Horse-shoe bank and some small patches close off Dora point, which are marked by a white buoy, the channel being there about 70 yards ide, with a bar, on which there were 7 feet water. Thence the channel dually increased to 150 yards in width off Clerk point, with depths of

1½ to 2½ fathoms; but 100 yards northward of this point a spit, with 4 feet water projects from the western shore within 60 yards of Horse-shoe bank. About mid-way between Dora and Clerk points a black buoy is placed on the edge of the shoal at one cable off shore.

On the east side of the north-west spit of Horse-shoe bank there was in 1862, a blind channel 150 yards wide, with 4½ to 1½ fathoms water, running 2 cables southward into the bank, beyond which distance there were only 2 to 4 feet water for more than a cable in that direction. This, however, in 1863, appears to have become the channel, as it then crossed the Horse-shoe bank.

The Western Shore of George bay from Clerk point, forms a bight extending S. by W. ¼ W. 1¾ miles to a projection a quarter of a mile westward of Atkins point. This bight, which is 4 cables deep, with several ledges of rocks along its north-western shore, is filled with mud-flats covered at half-flood, the eastern edge of which, from Clerk point, trends South, S. ½ W. and S.S.W. 1½ miles to one cable off the southern point of the bight, whence the outer edge of the western mud-flats sweeps round to the shore, about one-third of a mile to the south-westward of the point.

The outer edge of these flats is steep and regular, except 1½ cables north-westward of Pelican point, where a 5-feet spit projects about 100 yards. There are several long narrow ditches running nearly North and South through these flats, the most remarkable of which, from its entrance a quarter of a mile northward of Atkins point, runs up North to within 2 cables south-westward of the spit just mentioned; from 6 feet water in the entrance of this narrow inlet the depths increase to 12 feet near its northern end.

The Main Channel.—Into George bay from Clerk point, is bounded on the west side by the edge of the mud-flats just described, and on the east side by the Horse-shoe bank, the edge of the shoals northward of Pelican point, and the sand and mud-flats thence to Atkins point. From Clerk point the channel increases to 1½ cables in width, abreast of the south point of Horse-shoe bank, with 13 to 7 and 9 feet water; between Pelican point and the 5-feet spit to the north-westward of it, the channel is nearly one cable wide, with 2 to 4 fathoms water. From Pelican point to Atkins point the channel is generally about 1½ cables wide, with an average depth of 3 fathoms in the fairway; there are 8 fathoms water within 80 yards of Pelican point, and 4 fathoms close to Atkins point.

Eastern Shore.—From a steep point, on which stands the Constable's house, S.S.W. ½ W. 1½ cables from Atkins point, the eastern shore trends S. by W. ¼ W. nearly half a mile to the northern extreme of the south-east bight of George bay, which extends thence S.S.W. ¾ W. 1½ miles to a small islet, close to a projecting bend of the shore, nearly half a mile south-eastward of which is a small lagoon. This bight is bordered by flats, which from its north-eastern point, extend W. by S. four-fifths of a mile; the western portion of these flats, for a distance of half a mile, being about 2 cables broad and divided by two narrow channels, with 13 to 8 feet water. The northern edge of these flats is separated by a narrow channel, from a bank 200 to 100 yards broad, which, from 2 cables north-westward of the north-eastern point of the bight, extends W.S.W. 4 cables. Although the narrow channel between this bank, and the flats to the southward of it, has 12 to 17 and 11 feet water, it appears too narrow at its western end to have any outlet in that direction. From 1½ cables southward of the north-eastern point of the bight the flat, which borders the bight, extends 100 yards to 400 yards from the shore, projecting farthest from the middle of the bight.

From the projection a quarter of a mile westward of Atkins point, the western shore sweeps round about one mile in a S.W. by W. direction to the eastern point of the entrance of Moulting bay, between 3 cables and half a mile eastward of which some rocks lie close to the shore. This forms the southern shore of a hilly promontory, half a mile to one mile broad, projecting 1½ miles from the northward, between Moulting bay and the main channel from Horse-shoe bank to Atkins point.

The main channel from Atkins point trends in a S.W. and W.S.W. direction 1½ miles to its opening into George bay, and is bounded on the north-western side by the southern edge of the western mud-flats and the shore thence to the east point of the entrance of Moulting bay, and on the opposite side by the bank and flats before noticed. The channel is 150 yards wide abreast of the Constable's house, with 4 fathoms close to the point on which the house stands; thence it increases to a quarter of a mile in width one-third of a mile farther to the south-westward, between which and its opening into George bay it varies from nearly one cable to a quarter of a mile in width; with irregular depths of 10 feet to 5 fathoms, the bottom being sand throughout the channel, from the entrance into the bay.

The eastern and central portion of this extensive land-locked harbour of George bay, contains, independently of its south-western and northern arms, an area of nearly one square mile, with regular depths of 5 to 12 fathoms, over a bottom of sand.

South-west Arm.—From the small islet at the south-western extreme of the south-east bight of George bay, the south-eastern shore curves in a S.W. ½ S. direction nearly one mile to the south bight of the arm, which extends nine-tenths of a mile E. ¾ N. and W. ¾ S., and is one-third of a mile deep. About half a mile S.W. from the eastern point of the bight is a cliffy projection, on which are some farm buildings. From the western point of this bight the shore curves N.W. by N. a quarter of a mile to a projecting point, and thence nearly half a mile in a W. ½ N. direction to Jason's Gate bridge. Some rocks above water extend about 100 yards from the projecting point. From the islet to the bridge there are 3 fathoms water within a cable of the shore.

The land behind this shore is hilly, and one-third of a mile S.E. of the eastern end of the south bight, rises to the height of 180 feet; there are several small streams in the valleys between these hills, and some springs close to the beach, about half a mile to the south-westward of the small islet before mentioned.

McDonald Point, the north-west entrance point of the South-west arm of George bay, is a sandy projection lying S.W. by S. one mile from the eastern entrance point of Moulting bay, and forming the south-east side of the mouth of George river.

The north-western shore of the South-west arm of George bay, from McDonald point, extends irregularly, half a mile in a S.W. by S. direction to a small islet in the mouth of a narrow creek, trending about N.W. by W. 4 cables to the foot of a little ridge of hills, which extends thence nearly one mile in a N.W. by W. ½ W. direction. About one and 1¾ cables to the south-westward of McDonald point the low land between the South-west arm and George river is intersected by two narrow creeks trending nearly East and West.

George Bay on the northern side of the South-west arm, is a post town and telegraph station. A coach runs tri-weekly to the Corners railway station. A large amount of tin ore from Blue tier and Thomas plain is shipped here. There are many Chinamen in the district.

From the islet in the mouth of the creek, before noticed, the north-western shore of the south-west arm of George bay trends in and out, for a distance of three-fifths of a mile in a S.W. by W. ¼ W. direction to a low projecting point, on the west side of which, and a quarter of a mile within its extremity, is the mouth of a small stream flowing from the north-westward, and winding along the south-west side of the ridge. From the mouth of this stream the shore winds south-westward about three-quarters of a mile to Jason's Gate bridge.

From McDonald point to Jason's Gate bridge the shore appears to be everywhere inaccessible on account of mud-flats covered at half flood, which extend a quarter of a mile to half a mile from the shore. The edge of these flats, from about a quarter of a mile N.N.E. of McDonald point, trends E.S.E. 2 cables, and S.E. by S. 4 cables to an elbow projecting E. by S. half a mile from McDonald point, and forming between it and the small islet to the south-eastward, the entrance into the south-west arm. From this elbow the edge of the mud-flats curves three-fifths of a mile south-westward, and then sweeps round in a S.S.W. and W. ½ S. direction three-quarters of a mile to the east side of the mouth of an inlet, nearly one cable wide, trending N.N.W. ½ W. about a quarter of a mile, and reaching within 150 yards of the shore. From 5 fathoms in the entrance of this inlet the depths in it gradually decrease to 5 feet, at little more than one cable from the low point to the northward of it. From the west side of the entrance of this inlet the edge of the mud-flats trends W.S.W. a quarter of a mile, whence it turns in and out, half a mile in a W. by N. ½ N. direction to within a cable of the shore, and terminates at Jason's Gate bridge.

Oyster Patch is about 100 yards in extent, with 6 feet water, from which the cliffy point in the south bight bears S. ¼ E., and Jason's Gate bridge W. ¼ S.: there are 2 to 5 fathoms water close round the patch, and 3 and 4 fathoms between it, and the east side of the entrance of the creek 1½ cables to the north-westward. There are some stones on the mud-flat one-third of a mile to the north-eastward of the patch.

The navigable water in the south-west arm of George bay is half a mile wide at its entrance, whence it varies from 4 cables to three-quarters of a mile in width to within two-thirds of a mile of the bridge. There are 11 and 12 fathoms across the entrance, with similar depths up to Oyster patch, and 9 to 3 fathoms within a cable of the southern shore and of the mud-flats, the bottom throughout being mud. The navigable water in the western corner of the arm, for about two-thirds of a mile outside the bridge, is a quarter of a mile broad, with 7 and 8 fathoms close off the rocks which project from the southern shore, whence the depths gradually decrease towards the bridge, with 3 fathoms within 100 yards of the south shore, and of the mud-flats on the north side.

George River is one cable wide at its entrance, between McDonald point, and the low point to the north-westward of it, and fronted by small banks, extending a quarter of a mile to the northward. The river flows from the north-westward to about a cable northward of the ridge before-mentioned, and thence trends eastward to the entrance. From the entrance to three-quarters of a mile above it, where the river is only 50 yards wide, the depth of water does not exceed one to 3 feet.

From the north-west point of the entrance of George river the shore trends W.N.W. a quarter of a mile to a narrow creek, which communicates with the river one-third of a mile above the entrance and separates the low point from the more elevated land behind it. From this creek the western shore of George bay extends above half a mile northward to the west entrance point of Moulting bay, and is bordered by a mud-flat which from one cable north-eastward of the creek to the same distance southward of the point, does not extend beyond 150 yards from the shore; the edge of the flat being steep-to, with 2 and 3 fathoms close to it. At a quarter of a mile northward of the creek last noticed, there is a farm close to the shore, from whence a jetty projects nearly to the edge of the flat.

Between the western shore of George bay and the opposite promontory there is a clear space extending upwards of three-quarters of a mile N.E. and S.W., and half a mile from N.W. to S.E., having 9 and 10 fathoms water in the centre, and 5 fathoms within 100 yards of the mud-flats, in which the western portion of this space is embayed.

Moulting Bay, which is the northern arm of George bay, is three-quarters of a mile across East and West at its entrance, whence it extends North 1½ miles. From the east entrance point, to another projection half a mile to the northward of it, the shore is steep with 2½ to 4 and 5 fathoms about 50 yards from it. But with this exception the shores of the bay appear to be inaccessible, especially to the northward and westward, on account of a continuous mud-flat, the edge of which from the north point of the steep eastern shore just mentioned, extends 2 cables from the shore three-quarters of a mile farther to the northward. From the northern and western shores the mud-flat extends one to 2½ cables, and from the west entrance point it projects half way across towards the eastern shore, leaving an entrance two-fifths of a mile wide, with 2½ to 9 fathoms water. Within the entrance there is a space one mile long, North and South, and three-quarters of a mile to a quarter of a mile wide, with 5 to 2 fathoms water on a bottom of mud. The north and north-western shores of Moulting bay are low, and intersected by several small streams. On the west side of the entrance the land is hilly and rises to a summit 700 feet high, W. by N. 1½ miles from the west point of the entrance of the bay.

DIRECTIONS.—Although there is a sufficient space in George bay for a fleet of the largest ships, it is only available for vessels of light draught on account of the narrow intricate channel leading in the bay from its outer entrance, and the bars which obstruct the channel, there being only 9 feet water on the Outer bar to the north-westward of Bare Top hill, and uncertain depths in the shifting channels between Dora and Blanche points.

As the Outer entrance of George bay is exposed to the northward and eastward, gales from between these points may naturally be expected to cause heavy breakers upon the Outer bar, when it would appear unsafe for any vessel to attempt to enter; and even under the most favourable circumstances, there is only a sufficient depth of water in the entrance, for vessels of light draught, there being as little as 8 feet on the bar, at low water.

A vessel, however, adapted to the depth of water on the bar, having, with smooth water and a commanding breeze, approached near enough to the entrance to clearly distinguish Granite Rock point, should bring the beacons on the point in line, which will lead over the bar between Middle and North shoals, then steer to pass about half a cable southward of the point: thence, keep at the distance of about half a cable, along the western shore, between Granite rock and Dora points, passing between the white buoy off Dora point and the beacon on the spit of Horse-shoe bank. Having cleared the small patches close off the latter point, take the channel that may be the most practicable one, either along the western shore, leaving the black buoy on the edge of the flat on the starboard hand; or through Horse-shoe bank, which a stranger should ascertain before passing Dora point.

From the south extreme of Horse-shoe bank a mid-channel course may be shaped for Atkins point, keeping midway between Pelican point and the spit to the north-westward of it; and after passing close to Atkins point, and that under the Constable's house to the south-westward of it, steer from the latter point, in mid-channel between the northern shore, and the shoals immediately to the southward of it, 1½ miles, which will clear the channel into George bay.

TIDES.—It is high water, full and change, in George bay, at 9 h. 42 m.; springs rise 3 feet, neaps 2 feet.

The COAST.—Sloop Rock.—The east coast of Tasmania from Grant point, curves north-westward and northward about 3½ miles to a point, close off which lies Sloop rock. At three-quarters of a mile to the westward of Grant point is the entrance of a lagoon which branches to the south-westward and westward.

Between the point abreast of Sloop rock, and another projection N. by W. ½ W. 2½ miles from it, the coast forms an indentation half a mile deep, with a small double inlet in its south-west corner, and a sunken rock close off its northern point. From the northern point of this bay the coast sweeps round N.N.W. 2 miles to a small inlet, and thence extends N. ½ W. 5 miles to the entrance of Anson lake in the southern part of the Bay of Fires. *See* pages 428, 429.

The Gardens are some sunken patches which lie near the coast between the northern point of the indentation just noticed, and the small inlet 2 miles to the northward of it; but the outermost of these dangers does not appear to extend beyond a mile from the shore.

Soundings.—From 60 fathoms at 5 miles off cape St. Helen the soundings gradually decrease to 36 fathoms at 3 miles off Eddystone point. Between this line of soundings and the shore for about 5 miles southward from Eddystone point, the soundings decrease to 15 fathoms at about one mile from the shore.

CHAPTER VIII.

AUSTRALIA.—EAST COAST, CAPE HOWE TO PORT JACKSON.

VARIATION IN 1884.

Cape Howe .	. 9° 30′ E.	Port Jackson .	. 9° 10 E.

NEW SOUTH WALES.

The colony of New South Wales, lies between the parallels of 28° and 37° South and the meridians of 141° and 154° East, averaging about 500 miles in length and 500 in breadth, with a population estimated in 1881, at 751,468 persons. The colony is separated from Victoria, by Murray river, and an imaginary line from its nearest source to cape Howe.

The COAST.*—From Telegraph point two-thirds of a mile N. by W. of the north point of Gabo island the coast, which consists of bare white sand-hillocks, the highest being 143 feet, trends N.E. ½ E. 3 miles, to a sandy point, with a ledge of dry and sunken rocks extending from it, on which the sea breaks heavily; this point may be taken for cape Howe, as its bare sand-hills make it much more conspicuous, and from thence N.E. by N. 1¼ miles to cape Howe, the south-east point of Australia.

A Reef.—At from three-quarters to one mile S. by W., of the above-mentioned sandy point is a reef of rocks with 19 feet water on its shoalest part. This reef is a quarter of a mile outside a line drawn from cape Howe to Gabo island lighthouse, and 2 miles from the former; it breaks heavily during a swell.

CAPE HOWE is a low point composed of stones and sand, covered with tea tree, extending to the westward, almost level for 4 miles to the foot of Howe hill and the chain of mountains which extend nearly N.N.W. and S.S.E., 5 miles, of which it is the southern fall.

At 3 miles to the N.N.W. of Howe range is another range called Table hills attaining an elevation of 1,786 feet, so that the whole aspect of the country about cape Howe is that of a mountainous district.

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* *See* Admiralty chart, Australia, East coast, sheet I., Gabo island to Montagu island, No. 1017,; scale, $m = 0 \cdot 5$ of an inch.

A geodetic station, erected on nearly the highest part of the point one cable inland, to mark the boundary between Victoria and New South Wales, is 148 feet above the level of the sea.

HOWE HILL, 1,300 feet high, is conspicuous, rising abruptly from the adjacent low land, its southern aspect exhibiting a steep fall, and its summit being shaped like a haystack. From Howe hill a range of round and flat-top hills extends in a northerly direction to Wonboyn river. On the south-west side of Howe hill is a lake of brackish water.

About 2½ miles to the northward of Howe hill there is a deep cutting through the thick timber, open from the eastward; this is the boundary line cut by the Government of Victoria, dividing that colony from New South Wales.

The COAST.—From cape Howe a rocky coast trends N. by W. ½ W. 3¾ miles to Black head, thence N.N.W. 5 miles to some cliffs of granite and porphyry, which sweep round in a N. by E. and N.W. direction 5 miles to the southern extreme of a long sandy beach in Disaster bay. A barren heath extends from cape Howe to the cliffs, but these are surmounted by steep grassy hills, bearing gum, oak, and other trees.

The coast from cape Howe to the south bluff of Disaster bay consists of steep rocky points, with a few sandy indentions.

DISASTER BAY, situated about 12 miles N. by W. from cape Howe, is 5 miles broad at its entrance, and 3 or 4 miles deep, terminating in a curved sandy beach 3½ miles in length. In the north-west part of Disaster bay, and about 3½ miles from the rocky bluff forming the south point of the bay, is Bay cliff, the south head of Wonboyn river, which is only accessible to boats in fine weather; the narrow mouth of this river is sometimes fordable for cattle; but the sand is continually shifting.

Anchorage with north-east winds may be had in 13 to 17 fathoms water near the northern shore, with no dangers and a cliffy coast.

CAPE GREEN (*Bundooro*), lying 15 miles N. ¼ E. from cape Howe, is a smooth, low point, covered with grass, dotted with patches of small bushes, and sloping gradually to the eastward, from an elevation of 500 feet 3 or 4 miles inland; its shores to the northward are low and rocky; there are 16 fathoms within a quarter of a mile from the point, and no outlying dangers.

LIGHT.—A lighthouse 68 feet in height is erected on the extremity of cape Green from which is exhibited, at 144 feet above the sea, a *flashing* white light, showing a flash *every minute;* visible in clear weather between the bearings of N. ½ E. and S.S.E. ¼ E. at a distance of 19 miles.

The COAST.—From cape Green the coast trends N.W. by N., 3 miles to Bitangabee creek (with 9 feet of water), which is a good harbour for small vessels or boats; thence N.N.W. 4½ miles to Mowwarry point; and then N.W. by W. 3½ miles to Red point. The coast from cape Green to Red point is bold, with rocky points and small sandy beaches, having 15 to 20 fathoms within half a mile of the shore, the land along it being generally barren heath, with good grass on the points; the back country is hilly, and thickly wooded. Haycock hill, W.S.W. 2½ miles from Mowwarry point, is the highest of these hills; but the most elevated land in this locality is mount Imlay, a remarkable and densely wooded peak, bearing W. ¾ N., distant nearly 16 miles from cape Green.

Soundings.—There are 50 fathoms about 6 miles off cape Green, 48 fathoms 7 miles off Mowwarry point, and 42 fathoms 8 miles to the northeastward of Red point, with gradually decreasing depths towards the coast, along which there are 31 to 22 fathoms one mile from the shore.

MOWWARRY ROCK, is conspicuous from the southward, 80 feet high, and shaped liked a haystack; it lies 7¾ miles N.N.W. ½ W. from cape Green.

RED POINT, the south head of Twofold bay, lies 3½ miles N.W. by W. from Mowwarry rock, and may be known by a white stone tower on it 66 feet above the level of the sea.

TWOFOLD BAY is 2¾ miles wide between Red and Worang points, bearing N. by W. ¾ W. from each other; and from a depth of 20 fathoms midway between the points the bay extends 4 miles to the westward to the head of Nullica bay. The entrance is free from dangers, with the exception of a rock with 5 fathoms water, on which the sea breaks only in bad weather from the eastward, lying N. ½ E. a little more than one-third of a mile from the white stone tower on Red point; 1½ cables in the same direction from the tower, is a rock covered at high water, on which sea always breaks. Between this rock and the point there are 4 fathoms water, and between the two rocks 7 fathoms. The West end of the long sandy beach at the entrance to Walker river, kept in sight clear of Jews head, bearing W.S.W., leads to the northward of the 5-fathoms rock, in 14 fathoms.*

ASPECT.—The land about Twofold bay appears more mountainous than the part of the coast immediately north or south of it; the hills, which are either round or sharp-topped, lying in clusters, and gradually increasing in elevation to the westward. Mount Imlay, the highest, is conspicuous, being of a pyramidal shape, 2,910 feet high. This mountain is sometimes obscured, but when seen is an excellent mark for entering the bay. (See page 556.)

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* *See* plan of Twofold bay on Admiralty chart, Australia East coast Sheet I., No. 1017; scale m = 1·5 inch.

The Southern Shore of Twofold bay, between Red point, and Honeysuckle point three-quarters of a mile to the westward of it, forms an exposed bay, having 4 fathoms water close to its points, and 8 to 11 fathoms between them. A small rock above water lies close to the shore, a quarter of a mile to the south-eastward of Honeysuckle point.

From Honeysuckle point a bold cliffy shore extends W.S.W. nearly one-third of a mile to Jews head, off the north-west extreme of which, and in a direction towards Lookout point, is a rock with 3 fathoms water, 1½ cables from the shore; the white tower on Red point, kept in sight north of the north-east extreme of Jews head, leads clear of the rock in 7 fathoms. From Jews head the coast trends S.W. 3 cables to Munganoo point, the N.E. point of East Boyd bay.

EAST BOYD BAY, which appears to afford the most sheltered anchorage for large vessels on the south side of Twofold bay, extends from Munganoo point S.W. nearly one mile to Brierly point, and is half a mile deep. A bank with 12 to 9 feet water on it, extends about one cable from the shore round the bay to within a quarter of a mile of Brierly point, from which the bank projects one-third of a mile to the northward. East Boyd is a whaling station, on the east side of this bay, about one-third of a mile southward of Munganoo point, and contains a few houses inhabited only during the fishing season.

Anchorage.—Small vessels may anchor in East Boyd Bay, in from 3½ to 2½ fathoms, sandy bottom, by bringing Worang point and Munganoo point in line about N. ½ E.; further out in 5 or 6 fathoms, large vessels will find shelter from South and south-east winds, and smoother water with easterly winds than on the opposite shore in Snug cove.

Water may be obtained from a well, sunk on a flat at the back of one of the little sandy beaches, on the eastern shore of this bay, but in times of drought it is low and not good.

Kiyerr Inlet, at 1½ cables to the southward of Brierly point, is a shallow opening only a few yards wide, forming the mouth of a lagoon, separated from the southern shore of Twofold bay by a low narrow barrier, extending from Kiyerr inlet W.N.W. one mile to about one-third of a mile south-eastward of Torarago point, on which are the ruins of a tower, bearing W. ½ S., distant 1¾ miles from Munganoo point. The lagoon, which is full of low islets and shoals, forms the estuary of Towamba or Walker river, an inconsiderable stream winding into Twofold bay from the southward, having 6 feet at low water on the bar. This river is sometimes frequented by small craft to ship potatoes and whale oil, the boiling-down establishment being situated in a little bight south of Brierly point, named Kiyerr, beyond which the river is only navigable for boats. Between Brierly point, and Whale spit which dries at low water, and projects about 2¾ cables north-eastward from Torarago point, a bank, having 6 to 12 feet water on it, extends 4 to 2 cables from the low narrow barrier just noticed, and about three-quarters of a cable from Whale spit.

Red point, open to the northward of Jews head, leads clear of Whale spit.

Nullica Bay, which forms the western bight of Twofold bay, is 1¼ miles wide between Torarago and Oman points, with 4 to 5 fathoms water between them; the bay shoals gradually for a mile to the westward to 12 feet, 1½ cables from the beach.

Between Whale spit, and the mouth of Myruial creek, situated W. by N. ½ N. about one mile from the ruins of the tower on Torarago point, is a sandy bay, half a mile deep, close behind which is the remains of the township of West Boyd, consisting of a few deserted houses.

A flat, with 6 to 18 feet water on it, extends 2 to 4 cables from the shore between Whale spit and Myruial creek.

From Myruial creek the north-western shore curves round northward and north-eastward about 1¼ miles to Oman point. A ledge of rocks extends 1½ cables from the north point of the mouth of the creek; thence to Oman point, shoals with 6 to 13 feet water on them, extend one to 2 cables from the shore, except at half a mile northward of the creek, where there are 3 fathoms close to the land.

The shore from Oman point trends N.E. ½ E. nearly half a mile to Cocora point, which forms the west extreme of Snug cove. On the east side of Oman point a shoal, with 12 feet water on it, projects about 1½ cables from the shore; but there are 4 fathoms between the shoal and Cocora point.

Lookout Point is a rocky peninsula one-third of a mile broad, with a few stunted trees on its summit, and presenting a steep cliffy aspect to the southward and eastward; the point is situated about midway on the north shore of the bay, from which it projects towards the south-east about two-thirds of a mile; and is connected with the mainland by a low narrow spit of sand, half a cable wide, forming two small bights or coves, the southern of which is Snug cove.

LIGHT.—The lighthouse on the south extremity of Lookout point is a wooden structure 45 feet high, painted white, exhibiting a *fixed red* light, 125 feet above high water, visible in clear weather from a distance of 7 miles, between the bearings of N.W. by W. ½ W. through West to S.W. ½ S.; the light being intended only as a guide for coasters frequenting the place.

Rocks.—About 1½ cables East from the lighthouse is a rock, awash at low water, and E. by S. ¾ S. 2½ cables, is a sunken pinnacle rock, with 3½ fathoms; on the former the sea is nearly always breaking, but on the latter only in bad weather.

EDEN, a small settlement situated at the back of Lookout point. The town is built on the slopes and valley between two hills which jut out into the bay, dividing it into two parts, whence it derives its name. Eden since 1880 has recovered some of its former trade owing to the calling of steam-vessels, by which means the Monaro traffic has again been directed through Eden. The principal trade consists in the shipment of live stock to Hobart, pigs and bacon to Melbourne, and wool and hides to Sydney. Whaling is still carried on, but the whales are becoming scarce here. Population of Eden in 1881 was 230 persons and of the district 1,524. It is a telegraph station.

SNUG COVE, the anchorage off the township of Eden, extends nearly two-thirds of a mile East and West between Cocora point and the lighthouse, on Lookout point, but is not more than a quarter of a mile deep, and is bordered by a shoal, which extends 100 to 200 yards from the shore. There are 5 to 3 fathoms water in the cove, bottom soft clay and sand, where two or three small craft can lie land-locked off the jetty, by shutting in Red point with the south extreme of Lookout point. Larger vessels should anchor in 6 fathoms, about half a mile westward of the lighthouse, or in 4 fathoms about 1½ cables further to the north-westward, with the lighthouse bearing East, and Eden jetty, on the east side of the cove, N.E. This anchorage is, however, exposed to the heavy swell of an east or south-east gale, only partially broken by the heads, but during north-east winds it is snug.

Soundings.—There are 10 fathoms water midway between the lighthouse and Brierly point, whence the depths gradually decrease to 3 fathoms at the edge of the banks which border the shores of Nullica bay.

Yallumgo Cove is a small inlet on the north-east side of the isthmus which connects Lookout point with the mainland; some dry and sunken rocks extend across the entrance of the cove, and a reef borders the shore immediately to the northward of it.

All the points which project into Twofold bay are the terminations of thickly timbered ranges of hills, with numerous creeks and lagoons between them, most of which have salt, or brackish water.

Calle-Calle Bay, the exposed northern bight of Twofold bay, is 1¼ miles wide, N.E. and S.W., between Lookout and Worang points, and is nearly 1¼ miles deep, with 13 to 12 fathoms across its entrance, from the middle of which the depths gradually decrease to 3 fathoms at the head of the bay, close off the mouth of Curalo lagoon, a narrow shallow opening, at times apparently blocked up, and bearing N.W. by W. ½ W., distant 1¼ miles from Worang point.

Calle-Calle bay affords shelter from north-east winds, but it is not a desirable anchorage, being open to south-east and southerly winds, and almost always disturbed by a swell.

Curalo Lagoon is an extensive sheet of salt water, which, from its entrance trends, with gradually increasing width, about one mile to the south-westward, where it is half a mile wide, with a branch extending into the thickly timbered land to the north-westward. This lagoon, abounding with excellent fish, is only separated from the north-western shore of Calle-Calle bay by a low narrow tongue of land.

Pilots.—Twofold bay has a pilot establishment; and on a vessel making the usual signal, she will be boarded by a pilot as soon as practicable.

Signals.—There is a harbour-master and boat's crew stationed in the bay, with an efficient staff; a vigilant lookout is kept day and night; and vessels passing the port making their number, or any signal can be reported at Sydney or Melbourne by telegraph.

The day signal for a pilot to be made on board a vessel is the Union jack at the fore; and the night signal, burning a blue-light or firing a gun or rocket. Care must be taken to prevent anything liable to be mistaken for a white flag being displayed, as a white flag at the mast-head is the signal that a pilot is not required, the vessel being exempt by law, from the compulsory necessity of taking a pilot. Vessels likely to communicate with any of the ports along the East coast, should be provided with the above signals; although the Commercial Code is now in general use on all pilot stations on the coast of the colonies.

The following is an extract from the Pilotage Act, showing what vessels are exempt:—" Vessels of all nations outfitting to, or refitting from the fisheries, and all vessels arriving and sailing in ballast, or which may not break bulk or only to such an extent as may be necessary to provide funds for the repairs or refreshments required. All ships, vessels, and steam-vessels employed in the coasting trade, all ships or vessels trading between any port of New South Wales and any of the Australian colonies or New Zealand, and vessels under 25 tons register measurement, are exempt from pilotage, unless the services of a pilot have been actually required and received." Vessels above 25, but under 50 tons burden, are not required to take pilots; but, unless exempt as above, though they decline taking them, they are chargeable with half pilotage. Every vessel that actually takes a pilot must pay full pilotage.

A storm signal mast is placed near the lighthouse. Notice of gales blowing on any part of the coast of New South Wales will be communicated to vessels passing Twofold bay.

Custom House.—A custom house officer is stationed here, and the usual regulations must be observed, and the rates paid as at other ports of entry and discharge in the Colony, should a vessel break bulk or land passengers.

Supplies.—Wood in abundance can be procured in all parts of Twofold bay; water may be obtained at Eden, and also on the south side of the bay at East Boyd; other supplies are scarce, difficult to get, and prices high. The ponds and lagoons, which are at the back of most of the beaches are frequented by ducks, teal, herons, red-bills, and some small flights of curlew and plover; and the bay appeared to be well stocked with fish.

DIRECTIONS.—Twofold bay is so open to seaward and is so free from detached dangers, that there is very little difficulty in entering it; mount Imlay, bearing S.W. ½ W. will lead midway between the entrance points. On approaching the bay, care should be taken to avoid the sunken rocks which lie to the northward of Red point (see page 551), and having distinctly made out the lighthouse and other objects, the ruins of the tower on the east side of West Boyd kept on a S.W. by W. bearing will lead in through the middle of the bay, when a vessel may anchor either in Snug cove off the township of Eden, or in either of the anchorages off East or West Boyd, according to the prevailing wind, or as most convenient.

When running for Twofold bay in bad or thick weather, after dark, the light must not be depended on for making the place, as it is difficult to distinguish in such weather, and the lighthouse should not be approached within one-third of a mile.

In entering Snug cove with a southerly wind care must be taken to shorten sail in good time and to drop the anchor in 6 or 5 fathoms, before Red point comes on with the south extreme of Lookout point, and in veering cable the lead should be hove over the stern of the vessel.

In rounding Lookout point and entering Snug cove with much sea on, the Red tower amongst the trees at the back of the West Boyd town, kept open northward of Tararago point, S.W. ½ W., leads in 11 fathoms a quarter of a mile south of the rocks.

A vessel seeking shelter in Twofold bay from a south-easterly gale will find the anchorage off East or West Boyd, on the south side of the bay, far preferable to Snug cove; and it is by no means certain that it is not so even with an easterly gale. Captain Stokes, in H.M.S. *Beagle*, found the southern part of Nullica bay, off West Boyd, a very convenient anchorage, and which, he says, was the constant resort of coasters.

TIDES.—It is high water, full and change, in Twofold bay at 8h. 15m.; rise 5 to 7 feet.

The COAST.—Mewstone is a small rock, 20 feet high, lying one cable south-east of Worang point; it is steep-to, but there is no passage inside. From this rock the coast trends N. by W. ½ W. 2 miles to a point having close in front of it Bullăra or Lennard island, which is flat, with a reef projecting a short distance from its north extreme. From this island the shore curves N.W. by N. 2 miles to the red Quoraburagun cliffs, and thence North 2¼ miles to Ioala point, which is connected by a reef of rocks with Haystack rock, a remarkable round-shaped boulder, 50 feet high, lying close off the point. A succession of rocky points from Haystack rock sweeps round north-westward and westward one mile to the entrance of Panbula river. The most elevated land between Twofold bay and this river is mount Robinson, a long hill, 1,127 feet high, at 4 miles to the north-westward of Worang point, and 3 miles to the westward of Bullăra island. The land is everywhere thickly wooded, rising gradually to mount Robinson.

MERIMBULA BAY.—Is a sandy indent, lying between Ioala and Merimbula points, bearing from each other N. by W. ¾ W. and S. by E. ¾ E. distant 2¾ miles; it is about 1¾ miles deep, with 16 to 17 fathoms water, shoaling gradually to 8 fathoms within 2½ cables of the beach.

Hunter Rock, with 3½ fathoms, on which the sea seldom breaks, lies N. by W. 5 càbles from Haystack rock. The small sandy beach between two conspicuous bluffs at the West entrance to Panbula river, kept open of the north extreme of Ioala point, leads to the northward of Hunter rock; the extremes of Ioala point and Bullăra island in line lead to the westward; and Haystack rock on with Quondolo red cliff in the sandy bight south, leads to the eastward of it. There is a channel between Hunter rock and Ioala point, and the northern of the two bluffs well shut in by Ioala point leads through it.

Panbula River discharges itself into the south-west corner of Merimbula bay; and is accessible only for boats or small craft immediately after floods, which sweep the bar away. The river is about one or 2 cables wide, and trends south-westward nearly 2 miles into Panbula lake, which is about 1½ miles in extent, with several small streams flowing into it. The village of Panbula, at about 2½ miles to the westward of the entrance of the river, is situated near the Walker branch, which flows into the lake from the westward, between Melton hill to the northward, and Mowbray range to the southward of it.

Anchorage.—Good anchorage sheltered from south-west and southerly winds may be obtained off the entrance of Panbula river in 6 fathoms, with the northern part of Ioala point bearing East, and Merimbula point N. by E.

Merimbula Creek and Lake.—From the bluff forming the west head of Panbula river the coast is a long sandy beach, curving in a northerly direction for 3 miles to Merimbula creek, which runs out from the lake in the north-west corner of the bay. There are at times 7 feet at high water on the bar of this creek; it is visited weekly by a small steam-vessel from Sydney, which has to warp in through the winding, narrow, shoal channel to the small settlement some 2 miles from the entrance. Merimbula lake is somewhat of a triangular form, and about 1½ miles in extent, its eastern side being separated from the sea by a narrow sandy flat covered with scrub.

Merimbula is a township situated on Merimbula lake, with a population in 1881 of 130 persons; there are several storehouses and a pier situated nearly at the mouth of the lake; good roads extend back into the country, along which all the wool, and other produce, formerly taken to Twofold bay, is now carted down for export to Sydney. Merimbula is a telegraph station and there is weekly communication with Sydney by steamer.

No directions can be given for entering Merimbula creek, and it can alone be recommended for boats; buoys have to be placed by the trading steam-vessel almost every trip; the rocks on one side of the entrance, and the sand-spit on the other, causing great risk whenever she enters; the vessel is also frequently bar bound for several days at a time during neaps.

TIDES.—It is high-water, full and change, at Panbula river at 9 h.; springs rise, 4 to 6 feet.

MERIMBULA POINT projecting about a mile in a south-east direction from the north side of the entrance of Panbula river, is a steep, cliffy headland, affording at a quarter of a mile off shore shelter from north-east winds, in about 6 fathoms, sand; but on the appearance of a southerly wind it must be left, as a heavy sea rolls in.

The COAST.—About one mile N.N.W. from Merimbula point is Panbula inlet, whence the coast extends N. by E. 1¾ miles to Tura head, between which and Turingal point, N. ¼ W. 4 miles from the head, is a bay 1½ miles deep, divided midway by Bournda island, close behind which is a salt-water pool. Wallagoot lagoon which lies nearly one mile to the westward of Turingal point, is also salt, and is only separated from the shore of the bay by a narrow ridge, without any apparent opening.

Wolunda or Massey Peak.—From Panbula inlet to Bournda island the coast consists of sandstone and pipeclay cliffs, with grassy headlands and low scrubby ranges behind. The most remarkable hill behind this part of the coast appears to be Massey peak, a thickly wooded mountain 2,660 feet high, bearing W. by S. ¼ S., distant 11 miles from Tura head.

TATHRA HEAD.—From Turingal point, an uneven line of granite and pipeclay cliffs, with grassy land over them, extends 4 miles N. ½ E. to Tathra head, between which and Wajurda point, 2 miles N. ¼ W. from the head, is an exposed bay about three-quarters of a mile deep.

Tathra.—A small pier extends from the south shore of this bay, with moorings off it, laid down by the government; it is visited by the steam vessel on her way to Merimbula, and when the wind is off the land, or the weather fine, by small schooners; most of the Bega district market commodities are exported from this place. Communication with the town of Bega, 10 miles inland, is by coach.

Mogareka Inlet and Bega River.—About 1½ miles to the south-westward of Wajurda point is Mogareka inlet, the mouth of Bega river, which is sometimes open, with 6 feet water on the bar. Close within its mouth, where there is a small islet, this inlet forms three branches, two of which trend to the southward, whilst the main branch winds S.W. and S.E. about 2½ miles to two small islets, above which the river winds between the ranges of hills, from the westward. Between Tathra head and Mogareka inlet the shore is low and sandy; but between the inlet and Wajurda point the land is more elevated, with some rocks near the shore.

Baronda Head and Inlet.—Boronda head is a rocky projection nearly half a mile to the northward of Wajurda point, and forms the north side of the mouth of Baronda inlet, which is dangerous even for boats, being very narrow, with sunken rocks on either side of it. From Baronda head a beach extends N. by E. 2½ miles to Tanya lagoon, and at N. by E. 1½ miles from this lagoon is Bithry inlet, which is not fordable.

BUNGA HEAD.—From Bithry inlet the coast consists of a series of small projecting rocky points extending irregularly, N.N.E. 3½ miles to Bunga head, which is a steep, cliffy headland, forming the most prominent projection from the coast when seen from the northward or southward; the cliff is 200 feet high, having a peaked summit 400 feet high; several detached dry and sunken rocks fringe its base from a half to one cable distant. About one quarter of a mile S. by E. from the head lies Mimosa rock, so called from the steam-vessel *Mimosa* having been wrecked the sea breaks with heavy easterly winds, is about one mile long, N. by W. and S. by E., and one-third of a mile broad. The southern half of the island, 210 feet high near its centre, is of granite formation, with long rank grass and scrub growing on it, abounding with rabbits; the soil appears to be of a rich quality; its shores are rocky, and from 300 to 500 yards from the south extreme of the island, which is low and bare, there are a number of large granite boulders. The northern half of this island, some 20 or 30 feet lower than the southern, is of volcanic formation, masses of conglomerate lying about its surface and shore; it is also covered with long grass.

A ridge of rocks with from 5 to 9 fathoms water on it extends from the south-west extreme of Montagu island in a S. by W. ¾ W. direction little more than a mile; on its south tail are 6 fathoms, on which the sea frequently breaks in bad weather. The ledge is steep on both sides, dropping suddenly into 13 and 15 fathoms to the westward, and 15 and 20 to the eastward. It should be avoided by vessels, particularly small coasters, in heavy weather, as there is a confused sea on the ridge.

LIGHT.—On the summit of the island is a lighthouse, from which is exhibited at an elevation of 250 feet from the sea, a *fixed and flash* light, showing *a fixed light for* 30 *seconds, eclipsed for* 12⅔ *seconds, flash* 4⅔ *seconds, and eclipsed for* 12⅔ *seconds.* The light should be visible in clear weather for 20 miles.

Tides.—It is high water, full and change, at Montagu island, at 8h. 30m., springs rise 5 to 7 feet.

Anchorage.—In a small bight on the west shore formed by the two parts of the island, small vessels sometimes anchor with easterly and south-easterly winds, but it cannot be recommended for large ships. Small craft unable to get off the land or fetch a safer anchorage would find tolerable shelter in this little cove by getting as close in as possible with the gap open E. ½ N., one cable off shore. The bottom is irregular and rocky.

DIRECTIONS.—In navigating this part of the coast, steam vessels and sailing vessels having a fair wind, are recommended to keep inside Montagu island, about 2 miles off the mainland all the way to the northward, to avoid the southerly set usually found outside; an eddy will likewise be sometimes running to the northward.

SOUNDINGS.—From 5 miles off Thubbul river to about one mile westward of Montagu island, the soundings range from 51 to 17 fathoms, on a sandy bottom; but at 7 miles south-eastward of the island there is no bottom at 100 fathoms.

Wagonga Inlet has a narrow entrance, sometimes accessible to small vessels, but there is generally a heavy break across it. Within the entrance this inlet extends about 1½ miles to the south-westward, with several creeks branching to the northward and southward, and an islet, or bank in the middle of it, between which and the south-eastern bight of the inlet is the anchorage for such small vessels as may enter.

Wagonga is a small postal town, the population of the district in 1881 being 300. There are four saw mills. In the vicinity of mount Dromedary are extensive gold reefs.

YELLOW HEAD.—MARKA POINT.—From Wagonga inlet the coast, consisting of sandy beaches and rocky points mostly bordered by reefs, extends nearly N. ¾ W. 3 miles to Yellow head, on the north side of which is Minmuga lake, a salt lagoon, about a quarter of a mile wide, trending to the westward. A low sandy beach from Minmuga lake, extends N. by W. ½ W. 1¾ miles to Burra lake, which is about three-quarters of a mile in extent, and thence N. ½ E. 1¼ miles to a smaller lagoon, at N. by E. ½ E. half a mile from which is Marka point: the coast from this lagoon to Marka point and for about a mile to the north-westward of it, is bordered with sunken rocks. Although the country from Wagonga inlet to Marka point is partly covered with scrub and is intersected by salt lagoons, it affords good pasture along the headlands.

Turos Inlet (Boogon) and Turos River.—At about three-quarters of a mile to the north-westward of Marka point is a small hilly projection, whence a low narrow tongue of land extends North, three-quarters of a mile to the mouth of Turos inlet, which does not appear more than one cable wide, and is sometimes closed; but after heavy rains it is open, and only fordable at low water. Within its entrance Turos inlet forms a labyrinth of points, creeks, and islets, extending about 3 miles North and South, and East and West. At 3 miles westward of its entrance, Turos inlet receives the waters of Turos river, a considerable stream winding from the south-westward, through a good cattle country, over which there are several stations.

BINGE-BINGE POINT.—From the opening into Kialy lagoon at one mile northward of Turos inlet, a sandy beach, with scrubby land behind it, trends N. by E. 2 miles to a rocky projection, about half a mile to the northward of which is Binge-Binge point; both points have reefs of rocks projecting from them. From Binge-Binge point a succession of small bays and rocky points curve round N. by W. 1¼ miles to Mullinburra point and thence North 2¼ miles to Congar creek, a narrow inlet, with sunken rocks close to its mouth.

Petro Head or Black Rock.—From Mullinburra point the coast trends to the north-westward three-quarters of a mile to Petro head, or Black rock, from which a rocky ledge extends northward to abreast of

Congar point, which lies 1¾ miles to the northward of Petro head: there are only 3½ fathoms water on some parts of this ledge. The sea always breaks on the reef, and with strong south-easterly gales, it breaks heavily on some patches of the ledge, which would be dangerous to a small deeply-laden vessel, or might cause a large one to strike the ground in the hollow of the sea, which sometimes runs here in a heavy south-east gale. From Congar point the beach continues in a N. by W. direction one mile to Yowaga point, thence in the same direction for 1½ miles to the southern base of Toragy point, a peninsular headland forming the southern side of the entrance of Moruya river.

Between Binge-Binge and Toragy points there are good grassy headlands, with salt lagoons and scrub between them; near the latter point there are some forest gum and swamp oak trees, besides scrub.

TORAGY POINT and MORUYA RIVER.—Toragy point is the north-east extreme of a rocky peninsula, with some grassy slopes on its northern side, extending nearly half a mile from E.N.E. to W.S.W.; there are some rocks above water close off the north-east extreme, within 100 yards of which there are 5 and 6 fathoms water. On the western point or inner south head of this peninsula there is a pilot station, with a signal staff.*

Two rocky patches, on which the sea breaks in bad weather lie off the entrance of Moruya river, with 5 fathoms water over them. The southern patch lies E.N.E. three-quarters of a mile from the signal-staff, and the other 3 or 4 cables to the northward of the southern patch. Nearly half a mile from these patches to the eastward, the bottom is broken and rocky, with 6 to 9 fathoms. There are 8 and 9 fathoms, sandy bottom, between the patches and the south head. From one cable off Toragy point to half a mile off Congar point the bottom is rocky and irregular varying in depth from 2½ to 7 and 8 fathoms, and the sea breaks from one-half to three-quarters of a mile off shore in detached patches for the whole distance.

Moruya river forms a bar harbour, of which the narrowest part of the entrance lies between the west extreme of Toragy peninsula and a low point about 2 cables to the north-westward of it; but the channel is contracted to barely 100 yards in width by the North spit, which projects southward and eastward from the low north-western point to within 130 yards of the rocks under the signal-station. From 6 fathoms at one cable northward of the north-east point of the peninsula, the water decreases to

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* Described from the plan of Toragy point and Moruyu river, executed in 1864, by E. O. Moriarty, Esq., Engineer-in-Chief of harbours and rivers in New South Wales; scale, m = 1 foot.

8 feet at about one cable from the shore, midway between the north-east and west points. Thence to the narrow part of the entrance, between the signal-staff and the north spit, there are irregular depths of 7 to 14 feet at about a cable to 100 yards from the shore. At N. by W. ½ W. 100 yards from the signal-staff is a small rock above water, close outside which there are only 3 feet water. The government breakwater at the entrance to the river is nearly 2,000 feet in length.

From the west point of Toragy peninsula its rocky and sandy western shore trends nearly S.S.E. 2 cables to its south-west point; whence the western shore of the isthmus, which connects the peninsula with the land to the southward of it, curves one-third of a mile southward to a small creek; whence the southern shore of Moruya river, consisting of a low sandy beach, with rocky points projecting from it, extends West nearly a mile to a creek, bearing S.W. by W. ½ W., distant a little less than a mile from the signal-staff. There is a garden, with some buildings, along the west side of the isthmus, and at the back of the southern shore of the river, the land from a swampy sand-flat, rises westward to sandy ranges of no great height, covered with gum trees, oak, and scrub.

Southern Flats.—The bight formed by the eastern and southern shores, between the western extreme of Toragy peninsula and the creek, at about a mile south-westward of the signal-staff, is nearly occupied by two shoal flats, separated from each other by a narrow opening, too shallow even for boats, trending S.S.W. ½ W. from the direction of the signal-staff: but there is a boat channel, 50 to 20 yards wide, between the eastern flat and the west side of the isthmus.

From the north-east spit of the western flat, at 150 yards south-westward of the signal-station, the outer edge of the flat curves W. by N. 1¼ cables; whence it trends south-westward nearly half a mile, forming the southern and south-eastern side of the river channel, from the entrance. There is an islet on the south-eastern part of each of these two flats; that on the eastern flat being merely a small patch of low scrub, lying S. by E. one-third of a mile from the signal-staff. Quandolo islet, on the western flat, S.W. 4½ cables from the signal-staff, is considerably larger and more elevated than the other islet. The eastern flat is surrounded with water: but the south-western end of the western flat is connected with the mud which borders the southern shore.

The Northern Shore of Moruya river, from the north-western entrance point, curves about S.W. by W. ½ W. 4 cables to a small sand-spit projecting to the north-eastward, and thence trends W. ½ S. half a mile to a building near the shore, at Garland town. The land behind this shore is somewhat flat, and covered with open bush of swamp-oak and gum. Close to the eastward of Garland town is a stratum of fine red clay; and to the westward of the town the land rises to ridges of soft sandstone, covered with gum, oak, and scrub.

From its south-eastern extremity the inner edge of the north spit, opposite the signal-staff, after trending West 150 yards, extends N. by W. ½ W. 1½ cables, and thence turns westward towards the northern shore. The shore westward of the small sandy spit just mentioned, is bordered by a mud-flat, the outer edge of which, from this spit, sweeps round in a south-westerly and westerly direction to within a cable of the rocky southern shore, at W.S.W. one mile from the signal-staff.

The Channel of Moruya river, from its entrance between the signal-staff and the north spit, is bounded to the southward by the edge of the western of the two flats before described, and thence, by the rocky southern shore, to nearly opposite Garland town. And the channel is bounded to the northward by the inner edge of the north spit, by the northern shore thence to the small sand-spit, and then by the edge of the mud-flat which trends to the south-westward and westward from the sand-spit.

The channel between the southern edge of the north spit and the flat to the southward of it, is about 100 yards wide, with 7 to 10 feet water in the fairway; thence the channel gradually increases north-westward to the width of 1½ cables, with 6 to 9 and 7 feet water in the deepest part, close along the western side of the north spit. Thence the river channel trends south-westward, with an average width of 1½ cables, and 6 and 7 feet water in mid-channel, up to abreast of the small sand-spit, before mentioned, which projects from the northern shore. Thence the depth of water gradually decreases to 4 feet, the greatest depth being along the edge of the mud-flat on the north-west side, until the north extreme of Quandolo islet bears East, when the deepest water trends south-westward, towards the rocky southern shore; abreast of which there are 7 to 9 feet water. From Garland town Moruya river trends westward past Moruya for 3½ miles, to which distance it takes a winding course from the south-westward.

Although Moruya river is only adapted to steam and other small vessels of light draught, it promises to become a place of considerable importance, being the only outlet by water for the produce of the Araluen and Braidwood districts, with their gold-fields.

Moruya on the southern shore of Moruya river, and 5 miles from its entrance, has a population estimated at 830 persons in 1881. There is a telegraph station; and regular communication by coach and steam-vessels is maintained. The district is agricultural and mining.

PILOTS.—Vessels bound into the river must make the usual signal for a pilot, who are always on the look-out, and will either communicate in return from the signal-staff on the south bluff, or come off to the vessel.

DIRECTIONS.—Vessels entering, must always do so with the flood, more especially when there are freshets in the river; for then the ebb stream runs out through the narrow mouth at the rate of 7 knots, forming eddies that would prevent any vessel from steering, and she would be in great danger of being set on the rocks to the southward, or on the sand-spit to the northward. The channel across the bar is continually shifting, the average depth being about 7 feet at high water springs. Leading marks, painted white, are placed on the west end of the dyke on the southern shore; these kept in line lead into the South channel. Leading marks are also placed on a low sandy point, a short distance south of the dyke; these kept in line lead into the North channel. Flags are hoisted on either of these marks to indicate which channel to take, according to circumstances. The leading marks are only intended to lead over the bar, and keeping on this course after the bar is crossed will lead into danger. The South channel, when navigable, is always to be preferred, owing to the heavy rollers usually setting across the North channel.

Leading lights—*red* and white—are used for vessels entering or leaving at night, when weather, &c., permits their doing so with safety.

The bar is seldom smooth, and during southerly gales breaks for a considerable distance to the eastward of the heads.

The northern dyke in course of construction, has materially improved the entrance to this river.*

When over the bar, a vessel must be guided by circumstances, as the sand-banks near the entrance of the river change by every tide. At times, if there are no freshets in the river to colour the water, the greatest depth will be apparent, as the bottom consists of white sand or black rocks. Where the water appears most blue it is of course the deepest. The best winds for entering Moruya river are those from between North and S.E.; with southerly or south-westerly winds vessels get baffled under the southern head. Vessels after crossing the bar, and on approaching the entrance of the river, will pass close to a sunken rock, on which a beacon is placed; this should be left on the port hand. Here the tide runs very strongly, and vessels are apt to be horsed on to the North spit. The bottom is rocky, and anchors are almost useless, therefore it is advisable to wait until the tide slackens, either at high or low water, according to the state of the bar. This applies to vessels either entering or leaving, as also to vessels requiring a pilot, it being next to impossible to get a boat until the tide slacks.

Broulee, 4 miles north, affords good anchorage for vessels awaiting tide or otherwise. *See* page 569.

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* Mr. R. M. Tarrant, pilot.

An anchor should be ready to let go in time, after rounding the Inner South head.

The TIDES have not been recorded on the Colonial plan of Toragy point and Moruya river; but they probably differ very little from those in Bateman bay, 10 miles farther to the northward. It may therefore be assumed that it is high water, full and change, on Moruya bar, at 8h.; rise, 4 to 6 feet.

The usual tidal signals are shown on the flag-staff on the Outer South head.

ASPECT.—Peak Alone, bearing W. ¾ S., distant 11½ miles from mount Dromedary, although a solitary mountain, may be considered as the north easternmost of Maneroo range. The land adjacent to the shore between mount Dromedary and the entrance to Moruya river is low, level, and thickly timbered; receding to the westward it maintains the same characteristic features, broken only by a few undulating ranges of 300 to 400 feet in height, till it meets the base of the high coast range of mountains (some 10 or 12 miles inland), extending from the south extremity of Challenger range in a N. by W. direction for 20 miles to a cluster of high conspicuous peaks named Horns, the highest of which, Evening peak, lies W. ½ N. 14 miles from Toragy point.

This range, however, is not altogether uniform and uninterrupted, being broken about its centre, or at mount Lambert, which rises to an elevation of 3,200 feet; it here loses its general direction, forming deep gorges, gullys, and isolated hills, but from seaward these features are not perceptible, and a high unbroken range of mountains with sharp peaks will be seen for a distance of 20 miles North and South.

Moruya river, running through the Honoria valley, divides this range of mountains from Duke of Edinburgh range, which commencing at mount Haig, 3,381 feet above the sea, extends in a N. by E. direction for 24 miles to mount Fane, near the head of Clyde river, where it becomes broken into detached steep table-topped mountains. Some of the higher mountains in this range are conspicuous from seaward; Collarribee, Budawang, and Curreobilly, being respectively, 3,424, 3,628, and 3,619 feet high. A road through a pass over 2,000 feet high, has been cut near Budawang, connecting the Braidwood district to the westward of the range with the coast.

The COAST, from the north-west point of the entrance of Moruya river, consists of a sandy beach extending N. ½ E. 2½ miles to a small stream, between which and Broulee island, at N.E. by E. one mile from it, are two points, with reefs projecting from them.

BROULEE ISLAND, about a quarter of a mile eastward from the coast line is enclosed by a reef of dry and covered rocks, close outside which there are 4 fathoms water. This island forms the south-west point of a bay, which thence extends N.E. 2½ miles to Burrewarra point, and is nearly 1½ miles deep; the irregular western and northern shores of the bay are bordered by dry and covered reefs.

Anchorage.—In the N.W. part of the bay between Burrewarra point and Broulee island there is good anchorage, sheltered from north and north-east winds. Northward and westward of Broulee island, small vessels will find shelter from southerly winds in about 3 fathoms, with the north point of the island bearing E.S.E., and Toragy point in line with the point of the mainland immediately West of Broulee island.

Soundings.—The 100 fathoms edge of the bank of soundings, from 5½ miles to the eastward of Montagu island, extends about N. by E. to 15 miles East of Burrewarra point, and between Montagu island and Burrewarra point there are 50 fathoms between 4 and 5 miles, and 30 fathoms at 2½ miles from the coast, with regularly decreasing soundings towards the shore; the bottom being everywhere sand.

BURREWARRA POINT is a rocky headland 182 feet high, projecting about half a mile from the coast-line; it is closely fringed by a reef of dry and covered rocks, and there is a sunken patch close to the north-westward of it. Between this headland and a double rocky point at N. ¾ W., 1¾ miles from it, are two little bights, separated by a small prominent point, connected by a ledge of dry rocks with a rocky islet lying a quarter of a mile to the eastward of the point. There is a rock above water close to the south-western shore of the southern bight. From the double point a bay, partly bordered by a reef, extends N. ½ W. three quarters of a mile to South head, which has a rocky reef projecting from it, and forms the southern point of Bateman bay.

BATEMAN BAY extends from South head N. by E. ¼ E. 4½ miles to the North head, and runs in W.N.W. 3¼ miles from Tollgate islets in the middle of the entrance to the bar of Clyde river.

The swamps and lakes on the north shore of Bateman bay abound with swan, duck, teal, &c.; snapper fishing will be found off the rocky points.*

Bateman bay is a village on the Clyde, near its entrance into the bay, 130 miles south of Sydney. The district is noted for its fine timber, and there are several saw mills. It is a telegraph station, and has weekly steam communication with Sydney. Goulburn is the nearest railway station. Population in 1881, 200.

Black Rock, 32 feet high, lies N. by E. ½ E. one mile from South head, and is about 200 yards in extent, with 6 to 10 fathoms water close round it. Between this rock and Tollgate islets there is a channel 1½ miles wide, having 10 to 15 fathoms water, on a sandy bottom.

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* *See* Admiralty plan of Bateman bay, No. 2,176; scale, $m = 2$ inches.

The south-western shore of Bateman bay, from the South head, extends N.N.W. 1½ miles, and thence N.W. by N. 2¾ miles, to Observation head and consists of a series of rocky points and small sandy bays. From a point at two-thirds of a mile northward of South head, a reef of dry and covered rocks projects one-third of a mile towards Black rock. All the other projections of the south-western shore of the bay are also bordered by reefs of a similar kind, but none of them extend beyond 1½ cables from the points.

Trennant Rock, a small pinnacle rock with 3½ fathoms water on it and 12 to 13 fathoms close to, lies S. by E., one-third of a mile from the south extreme of Tollgate islets. There is a passage between Trennant rock and Tollgate islets with 8 to 10 fathoms, by keeping within a cable of the south island shore.

North head, in line with the east end of Tollgate islets, leads directly to it, and, seen open either side, leads clear. Entering Bateman bay to the southward of this rock, pass half a mile North of Black rock, and steer for Square head.

TOLLGATE ISLETS, which are two in number, are connected by a ledge of rocks and reefs, and extend together nearly half a mile N.E. by N. and S.W. by S.; the north-eastern, and larger islet is 140 feet high, and both are closely fringed with rocks, having 9 to 6 fathoms water at about 1½ cables outside them; from a conical rock between the Tollgate islets a ledge of rocks with 12 to 15 feet water extends N.W. ½ W. one-third of a mile; on the west end of the ledge there are 15 feet, with 7 fathoms close to; 1½ cables North and N.E. of the ledge the bottom is rocky, with 3 to 6½ fathoms, deepening suddenly to 9 and 10 fathoms, sand.

South Tollgate islet swarms with snakes.

A small vessel may take shelter under the lee of these islets; but it would be imprudent for a stranger to do so, except in a case of absolute necessity.

There is a channel one mile wide, with 7 to 11 fathoms water, between Tollgate islets and Three Islet reef, which lies S.W. ¼ S. three-quarters of a mile from North head.

Observation head, 50 feet high, is enclosed by a reef of dry and covered rocks. Snapper islet, at N.N.E. ½ E. one-third of a mile from the head, is about 100 yards in extent, and is the north-western and larger of two islets lying N.W. by W. ½ W. and S.E. by E. ½ E. nearly 2 cables from each other. Both islets have reefs about them; the eastern islet having a reef which extends 1½ cables to the southward. There are two shoal patches between this islet and Observation head, with 2 fathoms water between them and the head. From 1½ miles north-westward of South head to within one mile of Observation head, there are 12 to 8 fathoms at about two-thirds of a mile from the shore; but from one mile southward of the head to Snapper islet the shore is fronted by a shoal, with 3 to one fathom water on it.

Northern Shore.—North head, and Three Islet point at W. by S. ½ S. two-thirds of a mile from it, are both fringed with dry and covered rocks; but at the head of the little bay between these points there appears to be a sandy beach. Three Islet point derives its name from three islets lying close together, and extending S.E. by S. a quarter of a mile from the point. Three Islet reef, before noticed, which extends 1½ cables southward from the outermost islet, has a dry rock on it, with 7 fathoms water, 2 cables to the westward of it.

Reef Point is a small projecting headland at W. by N. three-quarters of a mile from Three Islet point, with a reef of dry and covered rocks extending about 1½ cables from it. The bay between Three Islet and Reef points is divided into two small coves by a point, having a ledge of dry and covered rocks projecting S.S.W. a quarter of a mile from it.

Acheron Ledge, which lies S.W. a quarter of a mile from Reef point, is about 1½ cables long, N.W. and S.E., with a rock above water on either end, and a bank, having 1½ to 4 fathoms water on it, extending S. by W. 3 cables from it. There are 6 and 7 fathoms water between Three Islet point and this bank; and there is the same depth of water on the west side of the bank, with 5 fathoms at 2 cables westward of the north-western rock on Acheron ledge.

Chain Bay extends from Reef point N.W. ¼ W. two-thirds of a mile to a point, from which ledges of dry and covered rocks project S.S.W. 2 cables and 1½ cables to the south-eastward; the eastern shore is also bordered by a reef; but between this and the ledges which project from the north-west point of the bay there is a sandy beach, one-third of a mile long, with 1½ to 2 fathoms within a cable of the shore. Immediately behind Chain bay there is some cultivated land, with buildings near it.

White Cliffs.—Square Head.—From the north-western point of Chain bay the northern shore trends N.W. by W. one-third of a mile to the White cliffs, and is bordered with dry and covered rocks, which project one cable from the cliffs, and extend along shore double that distance to the westward. From the White cliffs a smooth shore curves a little more than a mile in a W. by S. direction to the inner fall of Square head, 400 yards broad, projecting S. by W. half a mile from the low land behind it, to one mile northward of Observation head.

Soundings.—From the entrance of Bateman bay to a line between Acheron ledge and Snapper islet there are regular depths, decreasing inwards from 15 fathoms between Black rock and Tollgate islets, and from 11 fathoms between these islets and Three Islet reef, to 6 and 5 fathoms between Acheron ledge and Snapper islet. But the head of the bay is fronted by a shoal, the 3 fathoms edge of which, from 2 cables north-westward of Acheron ledge, curves in a W. by S. ½ S. direction at about one cable southward of Square head, and, after passing at a cable outside Snapper islet and the small islet to the south-eastward of it, closes the rocky point at one mile to the south-eastward of Observation head.

DIRECTIONS from the Southward.—Vessels approaching Bateman bay from the southward, should be careful to give Burrewarra point a good berth, and not haul into the bay until Black rock bears W.S.W., as there are dangerous rollers along the coast from the point to the rock. From about half a mile north of Black rock steer N.W. ¼ N. for Square head, keeping in mid-channel between Black rock and Tollgate islets.

From the Northward.—A vessel entering Bateman bay from the northward, should steer about S.W. by S. for Tollgate islets, passing the North head at the distance of about half a mile; and when Square head bears W. by N. ¾ N. steer for it on this bearing, which will lead one-third of a mile southward of Three Islet reef, and 2½ cables south of Acheron ledge.

Between Tollgate islets and Three-islet reef there are 7 to 10 fathoms rocky bottom, and with easterly gales, during the ebb tide out of Clyde river, there is a heavy confused sea all the way to the mouth of the river, with occasionally a heavy break in the bay.

Anchorages.—Tollgate islets afford shelter with winds from E.S.E. to S.W. The best anchorage will be in 8 fathoms sandy bottom, with the centre of the south islet bearing S.E. by S. distant half a mile, when, if the wind should shift to the North, vessels can get under way and pass between the islets and Black rock. In weighing from this anchorage and taking the southern passage, to pass westward of the 16-feet ledge, keep the North head summit (which is the highest hill over North head) in line over the first little sandy beach immediately within, and west of Three Islet point, bearing about N. by E. This will lead in 7 fathoms water half a cable west of the danger.

Small craft can anchor much closer in, with South islet on the same bearing in 5 or 6 fathoms. But the best anchorage recommended in Bateman bay for large vessels is in 5 or 6 fathoms, sand, at about half a mile westward of Acheron ledge; and for vessels of about 10 feet draught, is

1½ cables to the westward of the large Snapper island, (which can be passed on the north side close to in 21 feet), in from 12 to 15 feet, with the centre part of Tollgate islets in line with the edge of the north cliff of Snapper islet. A vessel will ride easy at her anchors, though a heavy ground swell is experienced; on the ebb tide setting out of Clyde river a kedge should be run out to the westward from the stern, to prevent being brought broadside on to the swell.

Although the anchorages in Bateman bay appear much exposed to seaward, a vessel with good ground-tackle, may lie here with comparative safety, almost at any time, if her berth be well chosen.

TIDES.—It is high water full and change at Observation head, Bateman bay, at 8h.; springs rise, 4 to 6 feet.

CLYDE or BUNDOO RIVER.—The entrance of this river may be considered to lie between Observation and Square heads, where the greatest depth of water in mid-channel is 4 fathoms, with decreasing depth towards the heads and towards the bar, at a quarter of a mile within the line of the heads.

The south-western shore of Clyde river from Observation head curves in a W. by N. ½ N. direction two-thirds of a mile to a projection, whence a low shore extends nearly N.W. 1½ miles to Smoke point. From the bay between Observation head and the projection next to the westward of it, the southern portion of the bar extends two-thirds of a mile towards Square head, and has a small sand-bank on it, lying N.W. ½ N. half a mile from Observation head.

From the south-western corner of Square head, the northern shore of Clyde river trends North half a mile to a small creek, and thence W.S.W. 1¼ miles to a low point, between which and the south-western shore are the first narrows above the bar, the river being here only 1½ cables wide. At half a mile and three-quarters of a mile westward of the small creek are two points, from each of which a small reef projects to the southward. From these points the northern portion of the bar extends in a S.S.E. ½ E. direction to within a short distance of the sand-bank, before mentioned.

The Bar.—The channel over the bar which extends across the entrance of Clyde river, on the north side of the sand-bank, just mentioned, had in 1870, 6 feet at low water, enabling steam, and other vessels of light draught to carry on a considerable trade with Clyde river.

Within the bar, at about a quarter of a mile to the north-westward of the sand-bank, there are 9 feet water, whence the river channel trends along the south-western shore, with the depth of water gradually increasing to the first narrows above the bar, where there are 4 fathoms between Smoke point and the low point to the eastward of it.

Between a small creek on the west side of Smoke point, and an inlet in the opposite shore to the northward, the river is half a mile wide, with an islet near the shore at one-third of a mile to the north-westward of Smoke point. From this part of the river it gradually contracts to the second narrows above the bar at one mile westward of the islet, where the river is only 2 cables in width. At about three-quarters of a mile westward of Smoke point the southern shore of the river is intersected by two creeks.

From the second narrows above the bar the river again increases in width, and trends W. by S. one mile to its junction with Macleay river, where the channel is about 2 cables wide. The southern shore between the second narrows and the mouth of Macleay river is intersected by numerous creeks. Macleay river takes its rise from the hills to the south-westward and westward, whilst Clyde river flows southward from the back of Cook's Pigeon house, a remarkable isolated, conical mountain 2,398 feet high, and distant 22 miles from the junction of the two rivers.

Nelligan, 183 miles south of Sydney, is situated on the right bank of Clyde river, and in 1881 had a population of 413 persons. The district is principally agricultural and pastoral. About 15 miles further up the Clyde is the settlement of Brooman, from which a large amount of produce is carried. There is a telegraph station here.

DIRECTIONS.—A vessel having arrived between Snapper islet and Square head should, in crossing the bar, keep the fairway buoy on the port and the other buoys on the south edge of the North bank on the starboard hand until the mouth of the river be opened. The buoys are painted black on their sides and white on their ends. The buoys get frequently shifted by the action of freshets out of the river, or bad weather from seaward, and the entrance has to be re-sounded and the buoys re-placed before entering over the bar. After crossing the bar, by hugging the south shore, deep water is carried up to the wharf.

Outward-bound sailing vessels should only attempt to go to sea at slack water.

The steam-vessel calling once a week from Sydney proceeds some 7 or 8 miles up the river to Nelligan.

There is no pilot at this river, and only the local steam-vessels and small coasters well acquainted with the place frequent it.

ASPECT.—The land about Bateman bay is low and thickly wooded, receding from each shore to an elevation of 400 to 600 feet. Further inland the country is mountainous; mount Oldrey a conspicuous round summit, 2,212 feet above the sea, is the highest of Clyde range, and lies

W. ¾ N. 12 miles from the North head of Bateman bay. This range extends in a south-east direction from Duke of Edinburgh range, and is separated from Belmore range, which lies parallel to it further South, by Macleay river. Mount Collaribbee, 3,385 feet high, lies W.N.W. 5½ miles from mount Oldrey.

Belmore range is separated from mount Haig by a deep gorge, and extends from Duke of Edinburgh range, in a S.E. direction along the north bank of Moruya river for 7 or 8 miles, terminating in a remarkable semi-detached mountain 1,945 feet high named from its shape, Camel's hump. This range is made up of five distinct and peculiar summits, mostly anvil shaped, with valleys or gorges between each.

From seaward, Honoria valley is remarkable when seen on a north-west bearing, apparently dividing the barrier of high mountains, and separating the coast from the inland ranges.

Flat Rock.—Wasp Islet.—The coast from the North head of Bateman bay extends N. by E. ¼ E. 5½ miles to Upright point, and consists of a series of small points and sandy beaches. At 2½ miles northward of North head, lies Flat rock, a mile to the northward of which lies Wasp islet, thence to Upright point the land recedes nearly a mile, forming a bay about 2 miles long, terminating in a sandy beach. At one mile to the south-westward of Upright point is the mouth of a narrow inlet, winding 1½ miles south-westward into a lagoon 2 miles long, N. by W. and S. by E. and half a mile wide.

UPRIGHT POINT is the termination of a ridge of hills extending from the westward, and was so named by Captain Cook, from its perpendicular cliffs.

Grasshopper islet is situated on a reef which projects above half a mile north-eastward from Upright point, and N.E. by N. about a quarter of a mile from Grasshopper islet, lies a ledge of sunken rocks, on which the sea breaks heavily.

Dawson Islets.—Between Upright point and a rocky projection N. ½ E. 2 miles from it, the coast forms a bay, of which the southern half is a sandy beach, with some sunken rocks along it. From the north point of this bay the coast continues N.N.E., 1½ miles to a point at the base of mount O'Hara, which rises close behind, to the height of 1,110 feet. A reef, on which are the two Dawson islets, extends about three-quarters of a mile eastward from this point.

O'HARA ISLET and HEAD.—The coast between the point at the base of mount O'Hara and O'Hara head, at N.E. ½ N. 2¼ miles from Dawson islets, forms a bay nearly one mile deep, with O'Hara islet lying near the shore at half a mile northward of Dawson islets. Between O'Hara nearly one cable wide, with 3 to 3½ fathoms water in the fairway, whence the depths gradually decrease to 5 feet, close to the northern shelf; but there is deeper water on the south side, there being 11 feet close along the back of the outer part of the pier. From 17 feet at the pier-head the depth gradually decreases to 3 feet within 30 yards of the shore, except on the Ballast in the southern corner of the harbour, towards which a jetty projects from the south end of the pier into 2 feet water. On the south-west side of the Inner harbour, there is a slip, between which and the jetty, two streams run through the beach; a small stream also flows into the north-western part of the harbour.

Ulladulla in 1881 had a population of 129 persons, and in the whole district 1,800. Dairy farming is the principal industry, but there is also plenty of good timber giving employment for saw-mills. There is a telegraph station here. There is weekly steam communication with Sydney, carrying mails and marketable commodities.

LIGHT.—A *fixed green* light, elevated 43 feet above high water, is exhibited from a lighthouse on the outer end of the pier at Ulladulla harbour, and in clear weather should be seen from a distance of 7 miles, between the bearings of S.W. ¼ W. and W. by N. ½ N.

DIRECTIONS.—When approaching Ulladulla from the north-east and eastward the heads are difficult to distinguish, being low, and the points adjacent resembling them. From the southward, when abreast of Brush island, the northernmost low point visible projecting from the shore, is Warden head, and on a nearer approach it may be identified by a deep gap cut through the trees, a short distance inland. Cook's Pigeon house (see page 574) bearing W. ¾ S., will lead to the entrance of the harbour, and when within 5 or 6 miles the white houses at the head of the harbour and the sandy beach under them will be distinguished.

Cook's Pigeon house kept over the centre of this sandy beach, on a W. by S. ½ S. bearing will lead in mid-channel, north of Sullivan reef, when within the reef, the Pigeon house will be lost sight of. North head should not be approached too close, as there is a depth of 14 feet, one-third of a cable south, from the low-water rocks extending south-east from it. When nearing the pier, keep more towards the north shore to avoid the ledge extending a cable E.N.E. from the pier end, with 8 and 12 feet on its north extreme; then haul in as the wind will allow, passing the pier at a convenient distance. Small vessels can anchor inside the pier in from 13 to 15 feet water, three-quarters of a cable from the beach.

The bottom is sand over rock; and if likely to blow hard from the westward, it would be necessary to run out a warp to a tree on shore, or bury a kedge in the sand, to prevent the possibility of dragging and tailing on to the pier. Steam vessels discharge alongside the pier.

During summer, sailing vessels are recommended in the early morning to tow or warp out towards North head, during the calm preceding the north-east wind, when a long board can be made towards Sullivan reef, and the next tack will clear the North head, or almost a fair wind may be made by taking the south channel; but this should not be attempted unless in fine weather, as it is narrow with a rocky irregular bottom, and in bad weather the sea breaks across the channel. When Lagoon head is seen clear to the eastward of Warden head, bearing S.W. by S., a vessel will be outside Sullivan reef, and in about 16 fathoms.

By Night vessels bound to Ulladulla from the northward, will in clear weather, sight the light on a south-westerly bearing before losing sight of cape St. George light: vessels from the southward, will have to keep an offing until the light opens out clear of the land. To enter the port steer about W.S.W. for the light, keeping a good look out to avoid Sullivan reef, which generally breaks, and should be passed at a distance of 2 cables on its north side.

Currents.—Vessels bound northward will find little or no current by keeping inshore between Brush island and cape St. George.

The stream coming from the northward, and striking the bluff headlands about Jervis bay, appears to be diverted from its general direction, and strikes the coast again about Brush island, leaving the space North and West of this limit, comparatively slack water.

TIDES.—It is high water, full and change, in Ulladulla harbour at 8h. 30m.; springs rise 6 feet.

Aspect.—From the north head of Bateman bay to the back of Ulladulla harbour a range of hills from 600 to 1,400 feet high follows the trend of the shore a little distance inland from it. The most conspicuous and first from the southward is O'Hara summit, which is flat, 1,100 feet high, one mile from the coast, and 3½ miles N. ½ E. from Upright point. From O'Hara summit the range is somewhat lower for 5 miles to Watson heights, consisting of three distinct round-topped hills, lying about 3 or 4 miles from the coast; thence in a N. by E. ½ E. direction the range continues, gradually decreasing in height, till lost in the flat rich agricultural lands between Ulladulla and Cook's pigeon house, which bears W. ¾ S., distant 11 miles from the north-western entrance head of Ulladulla harbour. Cook's pigeon house; Table hill, which lies between 4 and 7 miles N.N.E. of it; and mount Sydney, 2,496 feet high, at 4 miles to the northward of the Pigeon house, form a conspicuous group to a vessel approaching this part of the coast. From the north extreme of Table hill a ridge descends in an E. by N. direction towards the coast, whilst a lofty range extends W.S.W. 15 miles from the hill to mount Curroebilly, and then turns South 11 miles to mount Budawang, which is 3,630 feet high; hence the range trends S.S.W. to within 2 miles of mount Collaribbee, before mentioned.

Nurrawherre Inlet.—Between the north-west entrance point of Ulladulla harbour and a projecting double point at North 1¼ miles from it, the coast forms a sandy bay, with reefs projecting from both its points and also from the southern part of the beach. From the north point of this bay the shore curves N.N.W. 1¼ miles to Nurrawherre inlet, the northern half being a sandy beach, and thence N.E. by N. 2¼ miles to a low point forming the south-east side of the opening of Cuhudjuhrong lake, close in front of which is Green islet. Reefs extend from the south head of Nurrawherre inlet, to Preservation rock at 2 cables off it, and also from the foot of a hill at half a mile to the northward of it.

Green Islet and Cuhudjuhrong Lake.—Green islet is fringed by a reef apparently connected with the bar across the mouth of Cuhudjuhrong lake behind it, which trends West 4 miles, and is one-third of a mile wide. At about a mile within the mouth of this lake is a cluster of islets, immediately to the northward of which an arm of the lake branches to the northward.

RED POINT.—From the north-east point of the mouth of Cuhudjuhrong lake the coast trends N.E. 2 miles to Red point, which projects two-thirds of a mile eastward from the coast line; there are two small beaches between the inlet and the point, with hilly land behind. Between Red point and the narrow mouth of Swan lake, at N. ¼ E. 3 miles from it, is a bay one mile deep, the irregular shore of which is intersected by two small streams. Cadmurrah beach, which lies between three-quarters of a mile to the southward and 1¼ miles north-eastward of the mouth of Swan lake, has a reef projecting from the point at each end of it.

Swan Lake.—From its mouth, Swan lake continues very narrow for about two-thirds of a mile in a N.W. by N. direction, within which it forms a lagoon extending 1¼ miles N.W. and S.E., and one mile to half a mile across. From the entrance to Swan lake a sandy beach trends N.E. 1¼ miles to the west point of Wreck bay, which point forms the south side of the narrow mouth of Sussex inlet.

WRECK BAY.—ST. GEORGE HEAD.—Wreck bay is a dangerous bight, which, from its west point, extends E. ¼ N. 5 miles to St. George head, and is 2¼ miles deep in the eastern part. The northern shore of the bay, from the mouth of Sussex inlet, consists of a sandy beach fronted by rocks, extending nearly N.E. by E. ¼ E. as far as a rocky point at 2¼ miles north-westward of St. George head; but between this point and the head the eastern end of the bay forms a rocky bight bordered with reefs.

Caution.—Vessels navigating near this part of the coast during bad weather with easterly and south-easterly winds should guard against being set into Wreck bay.

Anchorage.—During the summer, anchorage may be obtained in Wreck bay, one mile off shore, in 7 fathoms, sandy bottom, with St. George head bearing S.E.

SUSSEX INLET and ST. GEORGE BASIN.—Sussex inlet is a narrow channel trending in a N.W. and North direction 1½ miles into St. George basin, which extends thence 3 miles to the northward, and is 5 miles long from W.S.W. to E.N.E.; and is separated from Wreck bay by a low tongue of land, one mile broad, extending 5 miles from the eastward to Sussex inlet. The western shore of the basin forms several large creeks trending to the westward, into the northernmost of which flows a small stream.

Aspect.—The land from Ulladulla harbour to St. George head is mostly low and thickly wooded, with ridges of hills extending inland from the coast between Red point and Wreck bay. From Table hill the main range takes an irregular semicircular direction to the northward and north-eastward, and, after rounding North and East of St. George basin, terminates at St. George head.

Soundings.—From 2 miles south-eastward of South head, to the same distance eastward of North head of Bateman bay, the soundings range from 25 to 30 fathoms, and then increase to 50 fathoms at 4 miles eastward of Upright point, between which and 4 miles southward of St. George head the soundings range between 50 and 60 fathoms, with decreasing depths to 30 fathoms at 3 miles E.N.E. of the head.

CAPE ST. GEORGE.*—From St. George head the coast trends N.E. by E. 3 miles to cape St. George; there is a small exposed bay midway between these two headlands, and the cape has some sunken rocks close about it.

From cape St. George a cliffy coast, with 27 to 29 fathoms water at one mile from the shore, winds North 2¾ miles to Governor head.

LIGHT.—Midway between cape St. George and Governor head is a steep cliffy projection, on which stands the lighthouse, a white tower, 61 feet high, exhibiting at an elevation of 224 feet above the sea, a white *red*, and *green* light *alternating every half-minute.* The white light is visible at the distance of 18 miles, and the *red* and *green* at 14 miles.

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* *See* Admiralty plan of Jervis bay, No. 2,176; scale, m = 1·5 inch.

From the southward, it opens of cape St. George on about a N. by W. bearing: from the northward the light opens of Crocodile head on a S.S.W. ½ W. bearing.*

Telegraph.—There is a telegraph station at the lighthouse, and vessels when passing, by hoisting their number, can be reported at Sydney. Notice of existing storms, on any part of the coast, are signalled to passing vessels.

JERVIS BAY.—Bowen Isle, which forms the south-western point of the entrance of Jervis bay, lies close off Governor head, from which it is only separated by a breach not much more than a cable across, appearing as if the cliff had been torn to pieces, and leaving here and there a straggling rock above water, forming a kind of breakwater, just within which is a small cove fit for boats. The isle is half a mile long, North and South, and 400 yards broad, with a hillock on its north end, 140 feet high. There are 14 fathoms water one cable, and a rocky patch of 9 fathoms at half a mile off the north end of the isle, and 2½ fathoms within a cable of its west side.

Bowen isle, which for situation, soil, scenery, and fresh water, seems the most desirable spot in Jervis bay, is moderately wooded, and has much clear ground, covered only with long grass. Its sea front is formed of high vertical cliffs, in many places deeply rent. From these cliffs the isle slopes gradually but irregularly towards the bay, and that side is low and sandy, intermixed with rocks.

Water.—The largest and most convenient stream of fresh water lies directly at the back of a little sandy bight on the west side of Bowen isle, where boats might easily load in fine weather.

PERPENDICULAR POINT, N.E. ¼ E. 2 miles from the north point of Bowen isle, is a bold cliffy headland, 263 feet high, and forms the north-eastern point of the entrance of Jervis bay. This point from its rising perpendicularly to a flat surface, without tree or shrub, is a most conspicuous feature of the coast. But there is an inner northern head to the entrance, formed by Longnose and Dart points, which lie W. by N. ½ N. 1¼ and 1¾ miles from Perpendicular point. The intermediate shore forms an irregular bight, with a reef projecting nearly a quarter of a mile from Longnose point, and a sunken rock with 12 feet water, on which the sea breaks in bad weather, lying 3½ cables S. by W. from the reef. Between the reef off Longnose point and the sunken rock there is a depth of 9 fathoms, and 11 fathoms about a cable to the southward of it. With the exception of this reef and rock, the entrance into Jervis bay is free from all dangers, with 25 to 12 fathoms water (and in one instance the 9 fathoms rocky patch half a mile off Bowen island), on a bottom of sand and mud, and deep water on both sides of the entrance.

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* The lighthouse is not well placed, especially for a vessel coming up the coast, as it is easy to run ashore in Wreck bay, without seeing the light, owing to its being obscured by the land to the southward.—Navigating Lieutenant W. J. Symons, H.M.S. *Wolverine*, 1880.

Within its entrance Jervis bay extends 8 miles North and South, and nearly 3 to 5½ miles East and West, with regular soundings, gradually decreasing inwards from 18 and 17 fathoms in the entrance, to 9 and 6 fathoms within half a mile of the greater portion of the shores of the bay; there is anchorage either in Darling road, to the westward of Bowen isle, or in Montagu road, to the northward of Dart point, but experience has shown that Darling road is the preferable of the two.

Darling Road is the southern part of a bay 2 miles deep, which from the north extreme of Bowen isle, extends N.W. by W. ½ W. 4¼ miles to Plantation point: some sunken rocks lie close to the extremity of the point. Two rocky heads project from the shore at S.W. by W. ¾ W. 2¼ miles, and W. by S. ½ S. 2¾ miles from the north extreme of Bowen isle; the north-western of the two heads having some dry and sunken rocks close off it. A sand-spit, with one to 2 fathoms water on it, projects half a mile north-westward from the eastern part of the bay, and adds to the security of the anchorage by breaking the swell which sets in; with this exception, the shores of the bay may be approached within a quarter of a mile in 6 and 7 fathoms. The shore from one to 2 miles southward of Plantation point is only separated from the eastern end of St. George basin by an isthmus 2 miles broad.

The western bight of Jervis bay, from Plantation point to Flora point, nearly 4 miles to the northward of it, is 1½ miles deep. At N.W. 2 miles from Plantation point is a small projection of the shore, from which a ledge of sunken rocks extends one cable into 2 fathoms water. There is a small lagoon close behind the beach to the southward of this projection, and at half of a mile to the north-westward of it is a small stream of fresh water. There are 4 fathoms water close to the eastward of the ledge of sunken rocks, and 2½ fathoms within a cable of the beach in front of the lagoon, with 4½ and 5 fathoms at 3 cables from the shore, to the south-eastward. Flora point and the shore for one mile to the S.W., and a quarter of a mile to the North of it, is bordered by sunken rocks, with to 3½ fathoms water close outside them.

The whole of the west side of the bay is exposed to the heavy swell thrown in by south-east gales, and is consequently unsafe for an anchorage; the sea breaking on it may be heard at a considerable distance.

Anchorage.—Darling road affords good anchorage in 6 to 8 fathoms about a quarter of a mile from the shore, with Perpendicular head shut in with the north end of Bowen isle, and Hole-in-the-wall (a white cliffy projection with a hole through it) bearing E. by S.

Fish.—Good seine, also hook and line fishing is to be had off the points, and beaches.

Montagu Road, which affords secure anchorage, extends from the north extreme of Dart point N. by W. 1½ miles to Montagu point, and is one mile deep. At nine-tenths of a mile northward of Dart point is a very small inlet, between which, and Calver dock nearly two-thirds of a mile farther to the northward, is a little bay, having 4½ and 3 fathoms water at about 2 cables from the shore. There are some sunken rocks about the south-west point of this little bay, and also close along the shore for half a mile north-eastward from Calver dock, with 5 and 6 fathoms within 2 cables of the dock; but the eastern bight of Montagu road is more shallow there being so little as 7 feet water at a cable from the shore.

Anchorage.—The anchorage in Montagu road is in 8 to 7 fathoms, stiff ground; but small craft may suit themselves in shore, as the soundings are regular, and there is likewise better shelter between the two points. Although ships of burthen may here lie landlocked, they are still exposed to a heavy fetch of the sea from the southward, but to which, indeed, every other part of the bay is subjected; it is therefore indispensable that the ground tackle be good.

Calver Dock is a small inlet about 80 yards long and 15 to 20 broad, with 5 feet at low water; it is a dock already half-formed, and with little labour might be improved into a very convenient one. Fresh water may be obtained near the beach at half a mile southward of Calver dock.

Hare Bay.—From Green point, with 2½ fathoms water close off it, at three-quarters of a mile north-westward of Montagu point, Hare bay extends West 1¾ miles to Flora point: it is 1¼ miles deep, and is divided into two bights by Red point, nearly equidistant from Green and Flora points. From a quarter of a mile eastward of Montagu point to Green point the shore is bordered by sunken rocks, which project 2 cables westward from the latter point. Between the extremity of these rocks, and 3 fathoms at a quarter of a mile off Flora point, there are 4½ to 5 fathoms water across the bay. The eastern and larger of the two bights into which Hare bay is divided, is mostly occupied by a shoal, with only one to 7 feet water on it, extending farthest from its south-eastern shore, between the eastern point of the bay and a winding creek at half a mile to the north-eastward of it. But the western bight—of which the north-eastern end is Plumsell bay—has 3 to 3½ fathoms between 3 and 4 cables from the shore.

DIRECTIONS.—Outside Jervis bay, and along the coast to the northward as far as Beecroft head, a heavy confused sea will be experienced during even moderately bad weather; and perhaps along the shores of the whole province there is no place where greater care is required in managing small vessels in bad weather than in the vicinity of this steep peninsula, in consequence of the agitated state of the sea, which may be attributed to the current out of Shoalhaven bight meeting at Beecroft head another branch of the stream in a disturbed state from interruptions whilst crossing Young banks, and the currents being so much stronger near projecting headlands than elsewhere.

Vessels bound into, or passing Jervis bay, ought carefully to avoid being drawn into Wreck bay, to the south-westward, the land being very deceptive. When bound into Darling road, steer for the north point of Bowen isle and round it not nearer than 2 cables, keeping Perpendicular point well open westward of the low north-west point of Bowen island, bearing N.E. ¾ E. until Governor head bears E. by S., which clears the sand-spit, when stand in shore for the anchorage. Although the isle may be closely approached, a vessel in light winds should keep without the influence of the swell.

Vessels from the northward and eastward, should give Perpendicular point a good berth, for, although it is bold and clear close to, a fresh south-east wind does not blow home, but becomes light and baffling, while the swell sets heavily upon it; and as there is no anchorage near the point, except at a great depth, it should be carefully avoided in light winds. After passing Perpendicular point the chief danger in the approach to Montagu road is the reef and rock lying off Longnose and Dart points, therefore vessels bound to Montagu road should steer in mid-channel between Bowen isle, and Longnose point, till Green point is seen well open of the next bluff northward of Dart point, before steering for the anchorage.

TIDES.—It is high water, full and change, in Jervis bay, at 8h. 30m.; springs rise 5 feet.

Supplies.—Fresh water can be obtained at the head of Darling road, and a quarter of a mile along the beach, to the southward from Hole-in-the-Wall, is a small stream always running. With the exception of a few fishermen, who are migratory, and a ship-building establishment on a small creek named Corranbean in the north-west corner, the shores of Jervis bay are uninhabited; no supplies can be obtained, but the ridges abound in kangaroo. The nearest town is Shoalhaven, 25 miles by land.

CROCODILE HEAD.—From Perpendicular point a line of cliffs trends N.E. ½ N. 1¾ miles to Crocodile head, and thence N. ½ E. 1½ miles to a bight half a mile wide, with three small islands, named Drum and Drumsticks, in the middle of it. From the northern point of this bight a continuation of the line of cliffs extends N. by E. 2 miles to Beecroft head, the east extreme of Crookhaven. There are 30 and 32 fathoms water within a mile of the shore between Perpendicular point and Beecroft head.

YOUNG BANKS[*] are two shoal rocky patches lying N.N.E. ¾ E. 3 miles, and N.E. ¾ N. 5½ miles from Beecroft head. The south-western patch is half a mile long N.E. and S.W., and 2½ cables wide, with 7 to 10 fathoms water over it, 16 and 17 on its north side, and 15 close to on the south side, the sea has been seen to break on it in heavy gales ; between it and Beecroft head there is a deep channel, though the soundings are irregular, ranging from 11 to 20 and 25 fathoms ; between this patch and the north-eastern one the soundings are from 14 to 21 fathoms, rocky bottom ; 12 fathoms is the least water on the north-eastern patch, deepening suddenly to 43 on its east side, and 14 to 20 fathoms half a mile West of it.

The vicinity of these banks should be avoided, as the current when strong causes heavy overfalls even during smooth water. Jervis bay lighthouse kept in sight clear of Crocodile head, S.S.W. ½ W., leads to the eastward; and mount Cambewarra, the southern and highest mount of Shoalhaven range, just seen to the southward of mount Berry, a remarkable isolated conical hill, on the lowland about Shoalhaven river, bearing W. by N. ½ N., leads clear to the northward, about one mile.

CROOKHAVEN BIGHT.—From Beecroft head, the coast trends N.W. for half a mile, thence round low rocky points, and two small bights to Crookhaven, where good anchorage may be obtained in Abraham's bosom, in about 6 or 7 fathoms water, with the north point of Beecroft head bearing E.N.E. distant half a mile. In rounding this north point, which is low and projecting, care must be taken to avoid a sunken rock on which the sea breaks occasionally, lying 1½ cables to the northward of its extreme, with 9 fathoms close to, and 6 between it and the shore. At the north extreme of Crookhaven bight, on the west shore, near some out-lying rocks off the beach, there is a narrow isthmus little more than 200 yards across, to a fordable creek running into the head of Jervis bay.

Shipwrecked mariners in this vicinity can reach Corranbean, by walking across this neck and skirting the north-west beaches of Jervis bay to the settlement, a less difficult route than making for Shoalhaven.

SHOALHAVEN BIGHT.—Vessels should during a prevalence of bad weather keep outside this bight, which extends from Beecroft head to Black point, a distance of 13 miles; as heavy tide rips exist, caused probably by the strong ebb stream from Crookhaven and Shoalhaven rivers (the velocity being much accelerated by rains) discharging into the bight, directly across the course of the ocean current running southward.

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[*] *See* Admiralty chart, Australia, East coast, sheet III., Beecroft head to port Jackson, No. 1,020 ; scale, *m* = 0·5 of an inch.

From the west end of Crookhaven a smooth shore curves in a N.N.W. direction 3½ miles to Kinghorn head, (a low projecting point,) between half a mile and 2 miles to the southward of which is a lagoon 2 miles long, North and South, and one mile wide, only separated from the sea by a very narrow ridge. From Kinghorn head a sandy beach curves N.N.W. ½ W. 2 miles to a narrow rocky point, forming the eastern head of the entrance of the southern Shoalhaven river.

SHOALHAVEN RIVERS, between which and Sydney there is communication by steam vessel to Greenwell point, three times a week. The rivers are separated from each other by Comerong island.

Caution.—No one should attempt to enter these rivers unless thoroughly acquainted with them, more particularly that of Shoalhaven, without having first procured a pilot, who will board vessels upon the usual signal being made.

LIGHT.—On the South head is erected a small wooden building, painted black, with a white gallows on top, from which is exhibited a *fixed* bright light, visible in clear weather, at a distance of 10 miles.

Bar.—The approach to Crookhaven river,—the southern Shoalhaven river,—is over a bar, with seldom less than 10 feet at low water, close to the west side of the eastern head, whence the channel, between the rocky shore on the eastern, and the sandy shoal on the western side, trends S.S.W. ½ W. about half a mile to the entrance of the river, between a rocky point projecting from the southern shore and the Sand head at 150 yards to the westward of it; the channel being here 100 yards wide, with 19 to 21 feet water. A white beacon is placed on the north-east extremity of the reef, extending about 200 yards from the South head. There are three other white beacons on the southern side of the channel. From the northern edge of this Sand head a narrow ledge of rocks, above water, extends nearly 2 cables to the northward, outside of which there are breakers over the sandy shoal on the western side of the channel, from the Bar to the entrance of the river.

Greenwell Point.—The south shore of the southern Shoalhaven river, from its entrance, trends in and out, in a W.S.W. direction, nearly one mile to Pelican rocks, which are above water, and project about 250 yards north-westward from the shore. From the inner end of these rocks the shore, after trending S.W. by W. one-third of a mile, turns southward and eastward, and forms a rounding point 1½ cables broad, on the opposite shore to which, at 2 cables to the westward, is the wharf of Greenwell point.

The northern shore of the southern Shoalhaven river from the Sand head, is formed by the south coast of Comerong island, trending W. ½ N. three-quarters of a mile to a mangrove point, between which and Greenwell point, at S.W. ¾ S. three-quarters of a mile from it, the river has no other shore to the northward or westward, than the south-east point of the south-easternmost of three Mangrove islands.

The navigable part of the southern Shoalhaven river is confined to a channel, half to three-quarters of a cable wide, leading through sand and mud-flats, which dry at low tides. For the first quarter of a mile from the entrance, the channel leads close along the northern shore, with 17 to 11 feet water, and is marked on the south side by patches of ballast. The channel next takes a W.S.W. direction nearly three-quarters of a mile to its widest part, between the north-west end of Pelican rocks and the south-east point of the south-easternmost Mangrove isle, and has 13 to 5½ feet water; its northern edge being marked by a small rock at N.E. ½ E. a quarter of a mile from the outer end of Pelican rocks. From these rocks the channel trends S.W. one-third of a mile to its junction with the navigable creek, which separates Comerong island from the mainland, to the south-westward of it; and from the entrance of this creek the southern Shoalhaven river channel leads S.S.W. ½ W. 2 cables to the wharf at Greenwell point. There are 6 to 12 feet water in the channel from Pelican rocks to the entrance of the navigable creek, and 8 to 10 and 6 feet water thence to the wharf.

From Greenwell point a shoal bight of the southern Shoalhaven river, two-thirds of a mile wide, extends about one mile to the south-eastward; but it is mostly filled with mud-flats, dry at low tides, and surrounding four small islands, the northernmost of which is Goodnight isle. From the west side of this bight the river trends S.W. 2 miles to a point, where it divides into small branches from the westward.

DIRECTIONS.*—The coast signal for bar harbours will be made, and vessels not requiring a pilot will have the tidal or necessary signals shown to them. The *Universal Code* is also kept for special occasions.

During south or S.W. winds, strangers should not attempt to enter if there is much sea on, but go into Jervis bay, or to the anchorage known as Abraham's bosom, in the S.E. corner of Crookhaven bight.

Approaching Crookhaven from the southward, passing Beecroft point at a distance of 2 or 3 miles, steer N.W. until the flag-staff on the South head bears S. by W. ½ W., then steer S.S.W., leaving all the white beacons on the port hand. The width of the channel is about 60 yards.

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* By Mr. J. H. Craig, pilot at Shoalhaven.

Vessels intending to enter Crookhaven river from the northward, should, when 2 or 3 miles off Black point, steer S.S.W. for the entrance, distant 8 miles, nearing which the flag-staff on the South head will be seen, as also the lighthouse.

When near the entrance a white beacon must be looked for, which is placed on the north-east extremity of the reef extending from the South head, leave this beacon about a cable on the port hand, three other white beacons must also be left on the port hand; having passed them a vessel is then inside, and can proceed up the river, leaving all the black buoys and black beacon on the port hand.

The Navigable Creek, which separates Comerong island from the mainland to the south-westward of it, forms a sort of canal between the two Shoalhaven rivers, navigable for barges or vessels of very light draught. For the first 1¾ miles from its entrance the general trend of this navigable creek is N.W. by W. ¼ W. 1¾ miles to the south-west point of Comerong island, to which distance it is bounded to the northward by the two southernmost of the three Mangrove isles which lie across the bight in the southern part of Comerong island. And the creek is bounded to the southward by the shore extending north-westward from Greenwell point by Apple Tree Orchard isle and the mainland to the north-westward of it. The width of the creek from shore to shore, is about 4 cables at its south-east entrance, and one cable abreast of the east point of Apple Tree Orchard isle, at half a mile from the entrance; hence to the south-west-point of Comerong island, the width between the shores varies from 150 to 200 yards.

The navigable creek channel from its south-eastern entrance to the south-west point of Comerong island is only three-quarters to a quarter of a cable wide, it being contracted by sand and mud-flats, partly dry at low tides. From the entrance, at 2 cables N.E. by N. of Greenwell point, the channel runs in 4 cables to the mouth of the creek which separates Apple Tree Orchard isle from the land to the southward of it. A small creek also branches off to the northward between the two Mangrove isles. From the entrance to these creeks there are 4 to 7 feet water in the channel, and its northern edge for a distance of 1½ cables is marked by patches of ballast.

The navigable channel from the two creeks which branch southward and northward from it, trends W.N.W. nearly half a mile to a patch of ballast on the north side of Apple Tree Orchard isle, passing close along the north side of the island, with depths of 6 to 11 feet water. At a cable to the north-westward of this patch of ballast the channel is divided into two narrow passages. The narrower, but deeper one continues close along Apple Tree Orchard isle 3 cables in a N.W. ½ W. direction, whilst the northern passage trends N.N.W. 2 cables to a creek which separates the Mangrove isles from the west point of the bight in the south part of Comerong island; hence the northern passage turns West 1½ cables to the north-western end of the narrow one.

In the northern passage the depth of water varies from 7½ to 2½ feet; but from dredging operations, there are 6 feet water in the narrow passage close along Apple Tree Orchard isle, to which the navigable channel is confined by a dyke extending a quarter of a mile, East and West, along the north side of the channel, where the two passages rejoin, at N.W. one-third of a mile from the ballast patch, on the north side of the island.

From the north-western end of the southern, or narrow passage, the navigable channel continues close along Apple Tree Orchard isle 1½ cables in a W. by S. direction, with 6½ to 2½ feet water, to the east side of the north-west end of the creek which separates that island from the mainland. A line of palisades extends hence W. by N. ¾ N. 250 yards, with 2½ to 9½ feet water close along them. From a point of land at the western end of the palisades, where the creek is barely one cable wide between its shores, the navigable channel curves close along the western shore 4 cables in a north-westerly and northerly direction, with 7½ to 12 and 7 feet water, to some buildings on the western shore.

The creek from these buildings takes a general N.N.E. direction three-quarters of a mile to its junction with the northern Shoalhaven river, and is 100 to 150 yards wide between its shores; the average width of the navigable channel being about 70 yards, with 6 to 14 feet water for the first 4 cables, between which distance and its junction with the northern Shoalhaven river, the depth of water increases to 4 fathoms.

COMERONG ISLAND.—The coast forming the eastern side of Comerong island, after trending in a N.N.W. ½ W. direction 2½ miles from the entrance to the southern Shoalhaven river, terminates at the north point of the island, which forms the south side of the mouth of the northern Shoalhaven river, and may be distinguished by a small hillock on it. On the west side, at a quarter of a mile southward from the point, is the narrow mouth of a lagoon in the northern end of Comerong island, whence the northern and north-western shores of the island trend West half a mile, and S.W. by S. nearly a mile to the north-western entrance of the navigable channel, which communicates between the two Shoalhaven rivers. With the exception of the hillock on its north point, Comerong island appears to be low and flat, with its southern shores mostly lined with mangroves, covered at high tides. There is some available forest and bush land on the south-eastern part of the island.*

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* Described from a plan of Crookhaven and Shoalhaven rivers, executed in 1864, by E. O. Moriarty, Esq., Engineer-in-Chief of harbours and rivers in New South Wales; scale, $m = 9{\cdot}2$ inches.

NORTHERN SHOALHAVEN RIVER.—The mouth of this river lies between the north point of Comerong island and the sand head at a quarter of a mile to the northward of it, and is crossed by a bar, on which the sea breaks. Within its entrance the river expands to more than half a mile in width, but again narrows to 2 cables across, between the north-west extreme of Comerong island and a point of the opposite shore. Between this and another point at one-third of a mile to the south westward of it, a creek branches off about one mile to the westward, whilst the river trends to the south-westward. Close to the north-westward of the entrance of the navigable channel, before described, is an islet, whence the northern Shoalhaven river extends nearly West 5 miles to Pig islet, with a width of nearly a quarter of a mile. Above Pig islet the river winds from a W. by S. direction, along the south side of Cambewarra range.

LIGHT.—At the north entrance of Shoalhaven river, a *fixed red* light, visible 8 miles in a clear night, is exhibited from the Pilot station.

DIRECTIONS.—Entering Shoalhaven river from the northward; after passing Black point, steer S.W. by S. until the breakers on the south spit are seen; these breakers extend about 1¼ miles off shore. Look for two leading marks which are placed on the sand, and which can be seen about 3 miles off in clear weather. Owing to the shifting nature of Shoalhaven bar, and the liability of the channel changing, the leading marks will be moved by the pilot as required; it must, however, be understood that the bar may so shift as to render it impossible to show leading marks for crossing; in such case the signals must receive especial attention. In September, 1873, there was 9 feet at low-water; the channel was about a quarter of a mile wide. When within half a cable of the beach, which is bold close to the shore: you are then inside. Steer a south-westerly course until you see a white house on the south side of the river, which steer for, keeping on the south side until you have proceeded about a mile above the canal; then steer for two houses on a hill on the north side, keeping the north side of the river for the remainder of the way.*

Persons are cautioned against anchoring, creeping, dredging, or fishing near the position of the sub-marine cable lying between Greenwell point and the opposite shore.

TIDES.—It is high water, full and change, in Shoalhaven rivers, at 8h. 30m.; springs rise, 9 feet, neaps 6 feet.

Aspect.—Mount Cambewarra, which bears W. by N., distant 9 miles from the entrance of the Northern Shoalhaven river, is the most remarkable summit of a range of hills extending from the mount S.W. by W. about

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* By Mr. J. H. Craig, pilot for Shoalhaven.

8 miles, and N.E. 4 miles to some table land. But the most elevated land near this part of the coast appears to be the mount Berry, which at 2 miles westward of the entrance of the river, rises from its northern shore to the height of 1,000 feet, and serves as a good guide.

BLACK POINT.—The coast from the entrance of the northern Shoalhaven river forms a sandy beach, extending, with a slight curve, N. by E. ¾ E. 5¾ miles to a small double creek, whence the coast trends S.E. by E. ½ E. half a mile to Black point, and rock, with a reef extending S.S.W. half a mile from them. Between Black point, and the south point of Geering bay at N. ½ E. 2¼ miles from it, are two small bights, separated from each other by a point with a reef projecting from it.

Gerringong is a small village, 7 miles south of Kiama on the south coast road, in the southern part of Geering bay. The steam-vessel for Sydney calls here.

Moorings.—Government moorings have been laid down in Gerringong roadstead in between 4 and 5 fathoms water, consisting of two anchors of 20 cwt. each, and 120 fathoms of 1¼-inch chain with two bridles; the position of each bridle being indicated by a nun-buoy.

These buoys are sometimes broken adrift from the moorings in heavy weather.

Caution.—Vessels are not to hang by the buoys. Immediately on the appearance of bad weather from S.S.E., veering easterly, vessels should slip and proceed to sea, as during bad weather from seaward, a heavy sea sets in on Gerringong.

Geering Bay extends one mile North and South, and is one-third of a mile deep, with a sandy beach, at the northern end of which is a small double inlet. The southern point of the bay and the beach for some distance to the northward of it, have a reef extending along them.

From Geering bay extends a succession of rocky points and small bights N. by E. and North 4 miles to the southern head of Kiama harbour. The points which project from the northern, and greater portion of this coast have ledges of sunken rocks projecting from them.

KIAMA HARBOUR is a little cove, available for vessels of light draught, sheltered from the southward and eastward by a peninsula, which together with the rocky shelf about it, extends 4 cables in an E. by N. direction from the mainland. It is 400 yards broad, and rises at the centre to a hill about 41 feet high, with a flag-staff on it, close to which is Blow-hole rock. There are two detached rocks above water, near the south side, and one close to the north point of the peninsula; the latter lying N. by W. ¾ W. 250 yards from the flag-staff. From this rock the entrance of the harbour extends N.W. by W. 3 cables, and is a quarter of a mile deep.*

From 150 yards northward, to about the same distance north-westward of the rock which forms the eastern point of the entrance, there are 7 to 4 fathoms water, with irregular depths between these soundings and the shore, and 4 fathoms at a cable off the south-eastern shore within the entrance; from this the depths decrease somewhat irregularly, up the harbour, in a S.W. ½ S. direction, to 6 feet water at about 150 yards from the shore. At about 150 yards south-westward of the rock which forms the south-eastern point of the entrance, a shoal runs out, in a N.W. direction to 11 feet water. In 1864, works, in view of the coal trade, were in course of construction on this shoal to project from the shore N.W. into 23 feet water, and W. by S. ¾ S. into 16 feet water, and forming between their outer ends an open space extending N.N.E. ¾ E. and S.S.W. ¾ W. 130 yards, and 60 yards deep, having 21 to 10 feet water, with a black buoy moored off it, in 16 feet water.

But the most secure part of Kiama harbour is an artificial basin formed between the south-western of these, and other works projecting nearly 100 yards in a N. by W. direction from a jetty at W. ¼ S. 2 cables from the flag-staff; the basin thus formed being 140 yards long, N.E. by E. ½ E. and S.W. by W. ½ W., and 80 yards deep. There is a red buoy moored in 14 feet water, off this basin, and there are 14 and 15 feet water across its entrance; whence the depths gradually decrease towards the shore, except where a small one foot patch lies about 50 yards south-eastward of the north-east side of the entrance. The north-east part of the basin forms a narrow inlet between the works and the shore, with its depth of water decreasing inwards from 13 to 9 feet.

KIAMA with a population, in 1881, of 1,200, and of the district, 5,835, is immediately behind a small open bay extending W. by N. ½ N. 300 yards from the jetty; but the shore being mostly rock, with shoal water off it, there is no convenient landing-place in front of the town. Although small, Kiama harbour is of considerable importance in the beautiful Illawarra district. Government moorings are laid down here for steam vessels, which regularly call in to land and embark passengers and cargo. Telegraphic communication is also established.

The west side of Kiama harbour from this little bay, trends northward a quarter of a mile to the north-western point of the entrance, and consists of perpendicular rock, 40 to 60 feet high, bordered by rocky shelves extending 50 to 150 yards from the shore, and projecting farthest towards the entrance of the basin on the opposite side; the intermediate space being about 120 yards wide, with 10 to 13 feet water.

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* Described from a plan of Kiama harbour, executed in 1864, by E. O. Moriarty, Esq., Engineer-in-Chief of harbours and rivers in New South Wales; scale, m = 5 feet.

LIGHT.—A *green* harbour light is exhibited from near the end of the breakwater, as a guide for vessels entering the port.

DIRECTIONS.—Vessels are recommended to steer for the outer buoy, until the mouth of the basin is opened out, when they should haul up for the north pier head, where a pilot is always in attendance.

Aspect.—The most elevated summit of Flinders ridge, to the south-westward of Kiama, appears to be mount Nipple, which bears S.W. ¾ W., distant 7 miles from Kiama head, and is 2,240 feet high, with one ridge extending W.S.W. from it, and another 10 miles north-westward to the south-western termination of Reliance range. Mount Fall, 2,106 feet high, and mount Broughton head, 1,800 feet high, are two other heights between Flinders ridge and the coast, the former at N.E. ½ N. 2¼ miles, and the latter N.E. by E. ½ E. 3 miles, from mount Nipple. From the north-western trend of Flinders ridge, ridges descend north-eastward towards the coast.

BASS POINT.—The coast from Kiama harbour extends irregularly, N. by E. one mile to a projecting head, and thence N.N.W. 2 miles to Minumurra river, close off which is Stack islet surrounded by a reef, having 16 fathoms water at half a mile the south-eastward of it. Reefs also extend from the projecting head into the bay to the north-westward. From Minumurra river two small sandy bays extend 1½ miles in a N.E. by N. direction, whence a line of cliffs trends north-eastward 1½ miles to Bass point.

Windang Islet.—Between Bass point, and Red point which bears North, distant 6 miles from it, the low coast forms an exposed bay nearly 2 miles deep, the sandy beaches, of which its shore consists, being separated by three rocky points, between W.N.W. and N.W., and at 1½, 2, and 2½ miles from Bass point. At North one mile from the northernmost of these points lies Windang islet, close to the beach.

Shell harbour between the first two points just mentioned, has a narrow entrance, only fit for small craft. The district is principally pastoral. The population amounts to about 200 persons. There is a telegraph station here; and communication with Sydney by steam-vessel.

ILLAWARRA LAKE.—The beach immediately behind Windang islet forms the only barrier between the sea and the south-east corner of Illawarra lake, which from 5½ miles W. by N. of Bass point, extends N.N.E. about 5 miles to nearly 2 miles westward of Red point, and is 3 miles wide. Macquarie river flows into the south-west corner of the lake, and

Mullet river flows into its north-western shore, which is intersected by numerous creeks.

About 2,600 bushels of fish are caught annually and sent to Sydney market.

RED POINT, so named by Captain Cook from the dull red colour of the cliffs and rocks of which it is composed, and, according to Captain Flinders, has four hillocks on it, which present the form of a saddle. Red point may also be readily known by mount Kembla, a remarkable hill, 1,786 feet high, at about W. by N. 6 miles from it, which, from its form, was named Hat hill by Captain Cook. From the back of this hill Reliance range trends S.W. ½ S. 12 miles, and N.N.E. 10 miles, descending in the latter direction behind mount Keira, 1,573 feet high, to the coast.

Red Point Islets and Tom Thumb Islands.—The former are three low rocky islets extending, nearly in line, one mile eastward from Red point, the westernmost and largest being 70 feet high; and Tom Thumb islands, which are two in number, the south-eastern being 20 feet high, and the north-western 15 feet, are also rocky, and lie respectively N. by E. ¾ E. 2 miles, and N. ¼ W. 2¼ miles from Red point.

Tom Thumb Lagoon.—From Red point, cliffs trend N.W. by N. one mile to the southern point of a sandy bay, which thence extends N. by W. ¼ W. 3¼ miles to Wollongong head, its southern part being three-quarters of a mile deep. At W. ½ S. 1¼ miles, from the north-western Tom Thumb islet, the beach which forms this bay is intersected by the narrow shallow mouth of Tom Thumb lagoon, which is 1¾ miles long, North and South, one mile wide, and is separated from the sea-shore by a narrow tongue of land, extending one mile from the northward to the mouth of the lagoon.

Soundings.—From 30 fathoms at 1¼ miles off Beecroft head the depth of water decreases to 10 fathoms at 3 miles N.N.E. of the head, whence the soundings increase with some regularity, to 42 fathoms at 5 miles off Black point, between which and 2¼ miles off Bass point, the soundings range from 30 to 44 fathoms, and then again decreases to 33 fathoms at 2½ miles south-eastward of Red point. The 100-fathoms edge of the bank of soundings, from 15 miles eastward of Black point, extends northward to about 17 miles off Wollongong head; and at about 20 miles eastward of Kiama head there are 280 fathoms, fine dark sand.

WOLLONGONG HEAD is a rocky peninsula projecting East 2 cables from the lower land to the south-westward of it; it is 1⅝ cables across from its south side to its north point, and rises to a hill 100 feet high, on which is a signal station, at S.E. ½ E. 1¼ cables from the north point. Some rocks project one cable from the south-east point of the peninsula.

WOLLONGONG HARBOUR, between which and Sydney there is daily communication by steam vessels, is the southern bight of a bay extending N.W. ¼ N. nearly two-thirds of a mile to a ledge of rock which borders the sandy shore for about 2 cables farther to the northward, and has detached rocks projecting from it about 120 yards to the south-eastward. From 5 fathoms at 1½ cables to the northward of the north point of Wollongong peninsula the depth of water decreases regularly to 2¾ fathoms within 150 yards of the detached rocks which project from the north-west point of the bay.

Wollongong harbour is protected by a Breakwater 450 feet long, extending W.N.W. from the north-west point of Wollongong head.

LIGHT.—On the Outer end of the Breakwater stands a circular iron lighthouse 56 feet above high water, exhibiting a *fixed red* light, visible in clear weather from a distance of 10 miles between the bearings of S.S.W., and W. by N. ½ N. The light is also visible inside the Breakwater to guide vessels into the basin.

A *fixed red* light is shown in the lower part of the north-east side of the lighthouse when it is dangerous for vessels to enter the harbour.

Para Reef.—The only detached danger in Wollongong bay is said to be Para reef, lying nearly E.S.E. 2 cables from the north-west point of the bay; there are 12 feet water on it, but when there is any easterly swell the sea breaks on this reef.

Basin.—On the north-east side of Wollongong harbour extensive artificial works have been constructed, forming a basin 450 feet in length, in a N.E. and S.W. direction and 120 feet broad, having an area of 3 acres, with depths of 12 to 15 feet, and wharfage accommodation of 1,700 feet. Under the coal staiths there is a depth of 18 feet at low water.*

Pilot.—A pilot with boat and crew is stationed at Wollongong, who will render service and assistance to vessels when required, but cannot be depended on for going outside to bring vessels in. Signals by the *Commercial Code* are made from the flag-staff, indicating that the pilot has left, and to look out for his boat.

WOLLONGONG, situated at the base of one of the highest peaks of the Illawarra range, ranks in tonnage and numbers of shipping the third sea port of the Colony. It is gradually increasing in importance, and contained in 1881 about 1,650 inhabitants. The coal mines about 3 miles, distant from the port, are connected with the basin by locomotive and horse traction railways. In 1880, 253,280 tons of coal of the value of 115,504*l.* were raised.

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* To meet the growing trade, the harbour is being enlarged, and an additional staith, and two steam cranes erected. The rock at the entrance to Wollongong is in course of removal.

Passenger steam-vessels ply daily to Sydney. A line of rail to Sydney is now in course of construction.

Exports, in 1881, 383 steam colliers and sailing vessels of 61,428 tons left the harbour, with 128,559 tons of coal. The other exports consist of pigs, calves, poultry, cheese, bacon, and about 700 tons of butter, which, together with the imports of merchandise, amounted to 60,000 tons.

DIRECTIONS.—If from the southward with a strong southerly wind, sail should be shortened and the vessel hove to, 2 miles south of Flagstaff hill, to enable the pilot to get off: if from the northward sail should be shortened in time and the vessel hove to off the port, for the same purpose. A vessel from the southward bound to Wollongong, should, after passing outside Tom Thumb islets, steer N.W. by N., and then round Wollongong head; when off the signal station, haul up to within a cable of the rocks, and work up for the end of the Breakwater, taking care to avoid Para reef, which lies nearly half a mile to the northward of it.

From the Northward.—Vessels running along the shore from the northward for Wollongong, should not, when within 4 miles of it, bring Wollongong head to bear to the southward of S.S.W. until Mark hill, a long double summit hill, barren at each end and thickly wooded in the centre, is in line with the centre of the bluff forming the eastern side of Wollongong harbour bearing S.S.W. ¼ W., which will lead to the eastward of Bellambi reef in 11 fathoms water, then steer for the harbour, keeping a good look-out for Para reef. There is a large mooring buoy in mid-channel for vessels to hang on by when they cannot work up.

By night Wollongong light is eclipsed over Bellambi reef, and also over the low land between Tom Thumb islands and Wollongong head. The entrance can therefore be approached if the light is in sight. When the port is neared, and a vessel is rounding the breakwater, it will be lost sight of, and afterwards come in view as a guide for proceeding into the basin.

TIDES.—It is high water, full and change, in Wollongong harbour at 8 h. 30 m.; springs rise 6 feet.

Towradgi Point.—From 2 cables northward of the north-west point of Wollongong bay a sandy beach extends, with a slight curve, N. by E. ½ E. 1½ miles to Towradgi point, which is formed of blue-stone boulders, with a covered reef extending from it. From Para creek, behind the ledge of rock at the southern end of this beach, a coast range of low sand-hills extends close behind the beach to Towradgi point; these hills are covered with coarse grass and scrub, with dense bush behind them.

Sandspit Point.—Between Towradgi point and Sandspit Point, at N.N.E. ¼ E. three-quarters of a mile from it, is a sandy bay, with ranges of low sand-hills close along the beach, separated by two creeks, the mouths of which are barred across by the beach. Sandspit point, which has some rocks close to its extremity is enclosed by a reef, which is always covered.

BELLAMBI POINT and REEF.—From Sandspit point a sandy beach, apparently bordered by a shoal, winds in and out, half a mile in a N.N.E. direction to Bellambi point, which consists of rock with a surface of sand. Bellambi reef, which partially dries at low water and always breaks, extends nearly E. by S. half a mile from the east side of Bellambi point, and has a rock about one cable in extent, lying S.E. by E., 4 cables from the point. There are 3 fathoms at one cable to the south-eastward, and 11 feet water at 50 yards to the north-westward of the rock with a boat channel nearly midway between it and the shore.

BELLAMBI BAY extends from Bellambi point N.N.W. ¼ W. 1¼ miles to a point with a ledge of rock projecting about one cable from it, and is one-third of a mile deep. The southern shore consists, like Bellambi point, of rock with a sandy surface, extending from the point half a mile in a W. by N. direction to a small creek close behind it. Hence to the north-west point of the bay, its western shore consists of a smooth sandy beach.

Bellambi Village.—From 150 yards northward to one-third of a mile north-westward of Bellambi point there are 3 to 6 fathoms water from which soundings, the depths decrease somewhat irregularly, to 2 fathoms within 100 yards of the shore, in a little bight extending a quarter of a mile westward from Bellambi point, and forming the sea frontage of Bellambi village. In the eastern corner of this bight is a jetty 500 feet long. Moorings have been laid down off the jetty, consisting of 1¾ inch mooring-chain, with anchors of 2 tons weight each, lying S.E. and N.W. from each other, in 5 to 6 fathoms water: mooring-bridles with red buoys are attached; and vessels may swing to any of the moorings in 3 to 6 fathoms water.

DIRECTIONS.—From a vessel bound to Bellambi bay from the southward, will be seen to the northward of the northernmost Hat peak a broken point in the mountain range, named Coorimal or Broken Nose, which being brought to bear W.S.W. will lead into the bay clear of the reefs.

From the Northward.—Vessels from the northward proceeding to Bellambi bay from 4 miles off Hacking point should steer S.W. by S. until a white sandy point forming the east extreme of the bay, is seen ahead. While steering for this point an iron-roofed store will show the jetty, which being brought to bear S.S.W., and steered for on that bearing, will lead to the moorings.

Embarking Coal.—Vessels drawing 10 feet or more (according to the tide), can take in their cargoes under the coal staith from the railway trucks at the end of the jetty. A tramway, 3 miles long, leads to the mines, where a clear dry superior steam coal is worked in a seam 9 feet thick.

WANIORA POINT.—From the north western point of Bellambi bay the coast extends North one mile to Waniora point, which has a reef projecting from it, and separates a small bight to the southward, from a sandy bay extending N.N.W. ¼ W. one mile from the point.

Bulli.—Bulli is a postal township and telegraph station, with a population in 1881 of 1,187 persons. It is the head quarters of the Bulli Mining company; the mine is about 1½ miles distant, and in 1881 the output was 95,703 tons of coal, valued at 50,717*l.* There are several farms in the neighbourhood. Communication with Sydney is either by rail and coach *via* Campbeltown, or by the Wollongong steam vessel. Within the bight to the north-west of this point is Bulli coal station, where a wooden pier 700 feet in length projects N.E. by E. over the rocks into 22 feet of water. This position is slightly protected from the southward by a reef of rocks, dry at low water, extending E.S.E. 1½ cables from Waniora point; and steam-vessels by making use of the buoys laid down for the purpose, may haul in as close as prudent towards the pier, and load in ordinary weather, as they would be able to get away on the appearance of a shift of wind to the southward. But it is a dangerous place for sailing vessels to load at, even under favourable circumstances.

Coal Cliff.—Stanfield Bay.—From Waniora point the coast extends N. by E. ½ E. 5¾ miles in a direct line to Coal cliff: for the first 2 miles the coast appears to be low and bordered by reefs, but the remaining portion consists of a line of cliffs. Stanfield bay is merely the northern of two small bights lying between Coal cliff and a little stream at N. by E. ½ E. 1½ miles from it.

Wata Mooli.—The coast from Stanfield bay extends, with a little indentation, N.E. ½ N. 8 miles to Wata Mooli a boat harbour, where water may be procured, with shelter for large boats, from all winds except those from the southward and eastward. This coast consists of a line of cliffs, range of low sand-hills extends close behind the beach to Towradgi point; these hills are covered with coarse grass and scrub, with dense bush behind them.

Sandspit Point.—Between Towradgi point and Sandspit Point, at N.N.E. ¼ E. three-quarters of a mile from it, is a sandy bay, with ranges of low sand-hills close along the beach, separated by two creeks, the mouths of which are barred across by the beach. Sandspit point, which has some rocks close to its extremity is enclosed by a reef, which is always covered.

BELLAMBI POINT and REEF.—From Sandspit point a sandy beach, apparently bordered by a shoal, winds in and out, half a mile in a N.N.E. direction to Bellambi point, which consists of rock with a surface of sand. Bellambi reef, which partially dries at low water and always breaks, extends nearly E. by S. half a mile from the east side of Bellambi point, and has a rock about one cable in extent, lying S.E. by E., 4 cables from the point. There are 3 fathoms at one cable to the south-eastward, and 11 feet water at 50 yards to the north-westward of the rock with a boat channel nearly midway between it and the shore.

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WANIORA POINT.—[illegible] the coast extends North [illegible] projecting from it, and [illegible] sandy bay extending N.N.W. [illegible]

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DER.—From Potter point a cliffy coast, closely nds N.E.½ E. nearly half a mile to cape Bailly, whence except where it is broken for about three-quarters of a mile, by a beach nearly midway between Stanfield bay and Boat harbour.

HACKING POINT.—From Wata Mooli the coast trends irregularly, in and out, 4½ miles in a N. by E. ½ E. direction to Hacking point, and is mostly fringed with dry and covered rocks, not extending far from the shore. Hacking point protects port Hacking from southerly or south-easterly gales.

Jibbon Bumbora, about half a mile to the south-eastward of Hacking point, is a detached patch of rocks 2 or 3 cables in extent, with 15 fathoms water at half a mile to the eastward, and 7 fathoms close to the northward of them.*

Aspect.—Ranges of hills extend close along the coast from Bellambi bay to Hacking point; Bulli hill rises to 1,048 feet, but they are not very remarkable; that most worthy of notice being Table hillock, 484 feet high, at S.S.W. 1½ miles from Hacking point.

Soundings.—From about 15 miles off Red point the 100-fathoms edge of the bank of soundings extends nearly N. by E. ½ E. to about the same distance off Hacking point, with 75 to 40 fathoms between 11 and 5 miles from the shore. But there are 56 fathoms, mud, at 3 miles off Boat harbour, and 24 to 16 fathoms at one mile from the shore from Wata Mooli to Hacking point, the bottom being mostly sandy.

PORT HACKING is a small anchorage, suitable for coasters, on the west side of Hacking point. The entrance, which lies between Hacking point, and Glaisher point at nearly two-thirds of a mile to the westward of it, is half a mile wide, with 4 to 5 fathoms water between the ledges of rocks which project from both points of the entrance. From Hacking point the port extends nearly one mile in a W. by S. ½ S. direction to a bar with 3 to 6 feet water on it, stretching across an opening between two rocky points, lying N. by E. and S. by W. one-third of a mile from each other, and forming an inner entrance, leading from port Hacking into the shallow, but extensive inlet to the westward.

Port Hacking is nearly half a mile wide, with two small sandy bights on the south side, divided by a rocky projection, close to which there are 2½ fathoms water. The northern shore, which extends W. by S. ½ S. barely half a mile from Glaisher point to the northern point of the inner entrance, forms the south end of a hilly promontory, a quarter of a mile to half a mile broad, extending 1½ miles from the northward. There are 11 to 6 fathoms from one mile north-eastward, to the entrance of port Hacking; but from 5 fathoms in the entrance, the depth of water decreases to 2 fathoms at about 2 cables from the north and south shores.

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* *See* Admiralty plans, of Botany bay and port Hacking, No. 2,179; scale, $m = 2$ inches.

Port Hacking Inlet.—From the inner entrance of port Hacking the southern shore of the inlet trends in and out, 2 miles to the westward, and is bordered by a bank extending 2 to 4 cables from the shore. At three-quarters of a mile to the westward of the southern point of the inner entrance is a rocky head, from which a shoal ridge projects N.N.W. one-third of a mile, with an islet on its outer end, and a smaller one on the west side of the ridge, close to the head.

A Boat Channel winds westward along the northern edge of the bank just noticed, but is only defined on the north side by the southern end of a hilly tongue of land extending, between two creeks, above one mile from the northward; and by the shore from a quarter of a mile northward to one mile westward of the northern islet. The channel is barely one cable wide between the east end of the southern bank and the rocky south-east point of the hilly tongue of land to the north-westward of it, and 120 yards wide between the south-western point of the tongue of land and the northern islet, to the south-westward of it. For about one mile to the westward of the islet the channel is 1½ to 2 cables wide, when the inlet forms two arms, one trending between the hills to the south-westward, and the other branching between other hills to the north-westward, in which direction a small river winds into the inlet from the south-westward.

TIDES.—It is high water, full and change, in port Hacking, at 8h. 45m.; springs rise 8 feet, neaps 7 feet.

Bate Bay, an exposed bight, 1¼ miles deep, between port Hacking, and Botany bay to the north-eastward, extends from Glaisher point N.E. 3¼ miles to Potter point, close to the north-westward of which is Botany cone, 180 feet high, with some dry and covered rocks extending from its base to the southward. At three-quarters of a mile westward from Potter point is another rocky projection, from which a reef extends three-quarters of a mile to the south-westward. The western shore of Bate bay trends in and out, nearly one mile northward from Glaisher point, to a point fringed by a reef, on the north-west side of which is a small sandy bight; this reef, which has 6 and 7 fathoms water close outside it, continues along shore for about one-third of a mile southward from the point. From this little bight Curramulla beach curves along the foot of bare sandy ridges to the rocky projection at three-quarters of a mile westward of Potter point. There are 10 fathoms in the middle of the entrance of the bay, between which and 9 fathoms water at a quarter of a mile off shore abreast of it, there are irregular depths of 7 to 11 fathoms. About three-quarters of a mile west of Potter point, there is a boat harbour having a depth of 6 feet in the centre.

CAPE SOLANDER.—From Potter point a cliffy coast, closely fringed with rocks, trends N.E.¼ E. nearly half a mile to cape Bailly, whence except where it is broken for about three-quarters of a mile, by a beach nearly midway between Stanfield bay and Boat harbour.

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A Boat Channel winds westward along the northern edge of the bank just noticed, but is only defined on the north side by the southern end of a hilly tongue of land extending, between two creeks, above one mile from the northward; and by the shore from a quarter of a mile northward to one mile westward of the northern islet. The channel is barely one cable wide between the east end of the southern bank and the rocky south-east point of the hilly tongue of land to the north-westward of it, and 120 yards wide between the south-western point of the tongue of land and the northern islet, to the south-westward of it. For about one mile to the westward of the islet the channel is 1½ to 2 cables wide, when the inlet forms two arms, one trending between the hills to the south-westward, and the other branching between other hills to the north-westward, in which direction a small river winds into the inlet from the south-westward.

TIDES.—It is high water, full and change, in port Hacking, at 8h. 45m.; springs rise 8 feet, neaps 7 feet.

Bate Bay, an exposed bight, 1¼ miles deep, between port Hacking, and Botany bay to the north-eastward, extends from Glaisher point N.E. 3¼ miles to Potter point, close to the north-westward of which is Botany cone, 180 feet high, with some dry and covered rocks extending from its base to the southward. At three-quarters of a mile westward from Potter point is another rocky projection, from which a reef extends three-quarters of a mile to the south-westward. The western shore of Bate bay trends in and out, nearly one mile northward from Glaisher point, to a point fringed by a reef, on the north-west side of which is a small sandy bight; this reef, which has 6 and 7 fathoms water close outside it, continues along shore for about one-third of a mile southward from the point. From this little bight Curramulla beach curves along the foot of bare sandy ridges to the rocky projection at three-quarters of a mile westward of Potter point. There are 10 fathoms in the middle of the entrance of the bay, between which and 9 fathoms water at a quarter of a mile off shore abreast of it, there are irregular depths of 7 to 11 fathoms. About three-quarters of a mile west of Potter point, there is a boat harbour having a depth of 6 feet in the centre.

CAPE SOLANDER.—From Potter point a cliffy coast, closely fringed with rocks, trends N.E.¼ E. nearly half a mile to cape Bailly, whence a more elevated line of cliffs extends about 1¾ miles northward to cape Solander, the south-west point of the entrance of Botany bay. A sand-hill rising from a bluff at half a mile northward of cape Baily, is the only hill worthy of notice over the cliffs between capes Bailly and Solander.

BOTANY BAY.[*]—The outer heads of Botany bay are cape Solander, and cape Banks at N.E. 1¼ miles from it, the latter being a small peninsula projecting a little more than one cable from the cliffy land to the northward of it. There are 4 fathoms water close to cape Solander, and 7 fathoms at one cable from cape Banks, with 10 to 17 fathoms between them. From cape Solander the south-western side of the entrance is a continuation of cliff trending N.N.W. and W.N.W. three-quarters of a mile to Inscription point, and is bordered by a rocky ledge, not extending beyond half a cable from the shore; this point and the shore for about one-third of a mile to the south-westward of it are fringed by a narrow reef.

The north-eastern side of the entrance of Botany bay trends in and out, three-quarters of a mile westward to a point, between which and the north-eastern inner head of the entrance there is a shallow bight. The north-eastern inner head, which lies N.N.E. three-quarters of a mile from Inscription point, has a tower on it, close to the west side of which a monument was erected to the memory of the unfortunate French navigator, M. La Perouse. Bear islet extends 1½ cables from the south point of this head, with which it is connected by narrow fringing reefs. At 1½ cables to the southward of the islet is Bumbora, a rocky patch with 4 feet water on it, between which and the south-eastern side of the entrance there is a channel nearly half a mile wide, with regular soundings in 8 to 10 fathoms, and a clear approach from seaward.

Within its entrance, Botany bay forms nearly an equilateral triangle, of which each side is about 4 miles long; the shores are low and wooded, with very shoal water extending a considerable distance from them, except for about one mile within the north-eastern inner head of the entrance, where some low hilly ranges terminate in two points, one at 4 cables, and the other nearly one mile N.W. by N. from the Monument, each point being closely fringed by a reef, with 3¼ fathoms close outside the former, and 2½ fathoms at one cable off the latter point. Between the Monument and the north-western point there are two shallow sandy coves.

The southern shore of Botany bay from Inscription point, sweeps round half a mile in a S.W. direction, whence a sandy beach extends W. by S. 1½ miles to Bonna point, between half a mile and 1¼ miles to the westward of which, the southern shore of the bay is formed by the northern end of a low flat peninsula, named Towra point extending from the southward, and separating a shallow lagoon, named Weeney bay, on its east side, from the estuary of George river on its west side. The lagoon, within its entrance includes Weeney and Quibla bays, extending nearly 2 miles East and West, and one mile South from its entrance.

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[*] *See* Admiralty plan of Botany bay, No. 2,179; scale, *m* = 2 inches.

Botany village is situated on the northern side of the bay. It is much frequented by parties of pleasure from Sydney, with which place it is connected by a tramway. There is a telegraph office here.

George river.—The estuary of this river is nearly one mile wide, between the west point of the peninsula, and a low broad point to the westward of it, whence a bight, one mile wide, extends 2 miles to the southward: Killigalere and Shell points give the southern part of this bight the form of a lagoon, called Woolooware bay, about the same size as that to the eastward of it. At W. by S. 1½ miles from the west point of the peninsula the estuary of George river is about a quarter of a mile wide, whence its main course, between the numerous creeks on either side of it, trends W. by N., 3 miles to the junction of George river, with a narrow creek, or rivulet from the southward: to this junction the river flows from the northward and westward.

Cook river.—From the west side of the estuary of George river the low sandy shore (Lady Robinson's beach), which forms the west side of Botany bay, curve N. by E. ¾ E. 4 miles to Cook river, a considerable stream flowing from the north-westward, and which supplies the city of Sydney with fresh water.

From the mouth of Cook river, which is about 3 or 4 cables wide, the north-eastern shore of Botany bay trends S.E. by E. ¾ E. 1½ miles to the foot of a hillock, between which and the first point to the south-eastward of it is a shoal sandy bay, one mile across N.W. and S.E. and nearly half a mile deep. At half a mile westward of the hillock is a small jetty, close behind which is an hotel

Botany bay is generally so shallow, that the only part having more than 3¾ fathoms water, is confined to the eastern side of the bay, between the entrance and three-quarters of a mile S.S.E. of the jetty, and is therefore quite open to the south-eastward. This space of comparatively deep water, is one mile wide, close within the entrance, whence it gradually narrows to the north-westward. There are 6 to 9 fathoms across the entrance, between Inscription point and the Monument, whence the depth of water decreases gradually, to 4 fathoms at three-quarters of a mile from the jetty.

At one cable to the north-westward of Inscription point there are 5½ fathoms, whence the 3-fathoms edge of the shoal water which occupies the greater portion of the bay, trends half a mile to the westward, and, after winding 2½ miles in a N.W. direction, turns south-eastward to about 6 cables off the jetty. From this 3-fathoms edge the water gradually shoals towards the southern and western shores and Cook river; the most shallow part being apparently off the low peninsula and the lagoon to the eastward of it, on the south side of the bay, where there are only 6 feet water at above three-quarters of a mile from the shore. From 6 cables off the jetty the 3-fathoms edge of the shoal water which projects from the north-eastern shore of the bay, trends in a S.E. by E. ½ E. direction to the first point to the northward of the Monument, with very shallow water towards the shore.

Directions.—To sail into Botany bay, keep in about mid-channel between the outer heads, and by not quite shutting in cape Banks behind the next point to the westward of it, the rocky patch 3 cables to the southward of the north-eastern inner head will be avoided. Having passed this danger, haul in towards the north-eastern shore, and anchor in 6 or 5 fathoms, with the Monument bearing about E.S.E. A vessel seeking shelter in Botany bay from a southerly gale, will probably find as good, if not better anchorage in 5 or 4 fathoms, at 3 or 4 cables to the north-westward of Inscription point. But, though the anchorage in the eastern part of Botany bay is of considerable extent where vessels may lie in 7 to 4 fathoms water, there is no shelter from south-easterly winds, and when they blow from that quarter, a heavy sea rolls into the bay.

Caution. — Masters of vessels, fishing parties, and others, are cautioned against anchoring, creeping, dredging, or fishing near the position of the Telegraph cable connecting Botany bay with New Zealand.

TIDES.—It is high water, full and change, in Botany bay, at 8h. 10m.; springs rise 7 to 8 feet.

Long Bay.—From cape Banks a line of cliffs extends in a N. ¼ E. direction 1½ miles to the south-west point of Long bay, which is half a mile wide at its entrance, whence it runs in two-thirds of a mile, and terminates to the northward in a narrow cove. Some sunken rocks project from the north-east head of the bay.

Coogee Bay.—From the projecting north-east head of Long bay, cliffs trend N.N.W. two-thirds of a mile to the south point of a bight two-thirds of a mile wide, from S. ¾ E. to N. ¾ W., and nearly half a mile deep. Between the cliffy headland which forms the northern point of this bight, and a projecting point at 1¼ miles to the northward of it, is Coogee bay half a mile deep in its northern part, where there are two very small inlets, the south-western of which has some sunken rocks close off it.

BONDI BAY.—From the northernmost point of Coogee bay—which projects nearly two-thirds of a mile south-eastward from the coast-line, and has some rocks close to the shore at half a mile northward of it—a double bight extends N. by E. ½ E. 1¾ miles to Eclipse bluff. A point at half a mile south-westward of the bluff, separates Grama Grama bay, on its south-west side, from Bondi bay N.E. of it. From Eclipse bluff a line of coarse sandstone cliffs extends, with a slight curve, N. ¾ W. 2¼ miles to Outer South head of port Jackson.*

Soundings.—At nearly E. by S. 14 miles from Hacking point there are soundings in 90 fathoms, dark sand, from close outside of which the 100-fathoms edge of the bank of soundings extends North and north-eastward to 100 fathoms at E. by N. 19 miles from Outer South head of port Jackson. From this 100-fathoms edge of the bank the soundings decrease with regularity, towards the shore, which, from 4 miles southward of Hacking point to the entrance of port Jackson, may be generally approached to the distance of about a mile, in 20 to 30 fathoms, the bottom being everywhere sand. There are no detached dangers off this part of the coast, except Jibbon Bumbora; and the ledges of rocks which project from most of the points, rarely extend beyond a quarter of a mile from them.†

PORT JACKSON, independently of being the port of the metropolis of New South Wales, is justly extolled as the most commodious and secure harbour on the east coast of Australia; and although vessels have sometimes been wrecked in attempting to enter, these disasters, in most cases, may be attributed rather to want of judgment and common prudence than to any real difficulty in making or entering the port.

In approaching port Jackson from the eastward, the summit of the northern of the two Sydney heads will, in clear weather, be first seen, from its being considerably higher than the adjacent coast. As the port is neared, it will be easily identified by the lighthouse and signal station on Outer South head and the bold, perpendicular profile of North head.

The characteristic features of the coast to the northward and southward of port Jackson, assume somewhat different aspects: for, although North head, with its immediate vicinity, presents a high, table-topped precipitous appearance, yet the high undulating hills, thickly covered with trees, which rise from the coast farther to the northward, are strikingly in contrast with the sterile table-topped cliffs which extend to the southward of the port; and would, even if the lighthouses did not present a conspicuous feature, point out whether the land seen, is to the northward or southward of the entrance of port Jackson.

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* *See* Admiralty plan of port Jackson, No. 1,069; scale, $m = 3·5$ inches.

† Mr. Largie, master of the barque *Jerusalem*, has reported the existence of an extensive bank of soundings off the coast of New South Wales, 40 miles from the land, and about the same distance south-east of the entrance to port Jackson.

Several soundings were obtained, the least water found was 20 fathoms.

At the time the soundings were obtained, a southerly gale was blowing, with very high confused sea.

Position, as given by Mr. Largie, lat. 34° 20″ S., long. 151° 54′ E.

OUTER SOUTH HEAD.—SIGNAL STATION.—Outer South head is a precipitous projection of the coast, which here consists of coarse sandstone cliffs, of a light reddish colour; the summit of the head is 300 feet above the sea. On the outer edge of the cliff, at about a quarter of a mile to the northward of Outer South head lighthouse, are a signal station and an electric telegraph office, communicating with Sydney. Storm Signals are shown. (*See* page 618.)

The pilots' look-out is kept at the signal tower, whence vessels' night signals for pilots will be answered by blue-lights.

LIGHT.—Outer South head new lighthouse is a white circular stone building, standing near the edge of the cliff, at a quarter of a mile to the southward of the signal station. It exhibits an electric *revolving* white light, attaining its greatest brilliancy *every minute*, placed at an elevation of 344 feet above the level of high water, and is visible in clear weather, from a distance of 21 miles between the bearings of N. by W. and S. by W. ¼ W.

The GAP.—From Outer South head the cliffy coast-line trends N.N.W. ½ W. one mile to Inner South head which forms the rounding point on the southern side of the entrance of port Jackson.

Midway between Outer and Inner South head lighthouses the profile of the cliffs breaks down to a deep hollow and indentation of the coast, known as the Gap, which is so remarkable, that it has in a dark night even been mistaken for the entrance of port Jackson.

Gap bluff, a projection immediately to the northward of the Gap, rises to the height of 300 feet.

INNER SOUTH HEAD.—From Gap bluff the ridge gradually descends to Inner South head, which is 60 feet above high water, and has a lighthouse erected upon its extremity.

LIGHT.—Inner South head or Hornby lighthouse, which is intended for actual guidance into the harbour, after the more lofty Outer South head lighthouse has shown proximity, is a tower 30 feet high, painted red and white in vertical stripes, and built upon the edge of the cliff of Inner South head; it shows a *fixed* white light, at the height of 90 feet above high water, and is visible in clear weather, from a distance of 14 miles, between the bearings of N.W. by N. and S.W. ¼ W. The light suddenly opens out from Gap bluff upon the former bearing, if coming from the southward, when abreast of, and 5½ miles off Botany bay heads; or upon the latter bearing, if coming from the northward, the light will open out from Outer North head a little before the floating light appears, bearing

S.W. ¾ W. By inclining a couple of reflectors, the light may also be thrown immediately down upon the South reef, at the base.

SOUTH REEF is a ledge of rocks extending nearly a cable to the northward from the base of Inner South head and is the only projecting spit to attend to between Inner South and North heads: it is easily seen in the daytime, by the sea constantly breaking upon it; and now that Inner South head is distinguished by a light at night, the head need only be given the usual berth to ensure clearing the reef.

The water is deep along the coast between Outer and Inner South heads, there being 14 fathoms at a quarter of a mile, and from 4 to 9 fathoms within a cable of the shore; but the cliffs are so precipitous as to afford no refuge in the event of shipwreck.

OUTER NORTH HEAD, on the north side of the entrance of port Jackson, is a table-surfaced, sharp-elbowed, perpendicular cliff, 242 feet high N. by E. ¼ E. 1¾ miles from Outer South head signal station. The east coast of North head promontory is a high precipitous cliff, first trending from Outer head N. ¾ E. one mile, and then nearly N.W. three-quarters of a mile, to Cabbage Tree bay; this coast is also bold, there being from 4 to 13 fathoms water at a cable from the shore.

INNER NORTH HEAD, W. ½ N. nearly three-quarters of a mile from Outer North head, is a projection of the cliffy coast extending from Outer North head, and forms the north side of the entrance of port Jackson.

The ENTRANCE of PORT JACKSON is 1¾ miles wide, between Outer North and South heads; but the narrowest part, or what may be considered the actual entrance, lies between Inner North and South heads, where it is a little more than three-quarters of a mile across from cliff to cliff, N. by E. ½ E. and S. by W. ½ W.; but this breadth is reduced by a rocky spit on each side, to barely three-quarters of a mile. The entrance is clear of dangers, and the soundings are regular; the depth in mid-channel being 17 fathoms, sand. Although there is a depth of 9 to 12 fathoms within a cable of the northern shore, the sea generally rolls in and breaks heavily upon the cliff.

The SOUND is that part of port Jackson immediately within the entrance, and which branches off into Spring cove, and North, and Middle harbours. Although the Sound occupies an area of nearly 1½ square miles, with regular soundings in 8 and 9 fathoms, it is too exposed to the ocean swell to afford safe anchorage, except with off shore winds.

Spring Cove and Quarantine Establishment.—From Inner North head the cliffs recede to the north-westward for about half a mile, terminating at a hummocky point, upon which is the quarantine signal station : this forms the sheltering point of Spring cove, where 4 or 5 vessels, in moderate weather, may get into safe anchorage, to ride out quarantine. The quarantine establishment and burial ground are situated at about a quarter of a mile from the cliff, between Spring cove and Inner North head.

North Harbour is a deep bight to the north-westward of Spring cove, with regular soundings of 6 to 8 fathoms, and, although not apparently open to the fury of south-east gales, it is a treacherous anchorage; but if a vessel, after running for Spring cove, finds its limited space so filled by vessels as to prevent her taking up a berth, she may anchor in 6 fathoms, at about a quarter of a mile to the northward of the north point of Spring cove, at a cable from the eastern shore, and in some measure be sheltered from the sea, which south-east gales send into the middle and western portions of North harbour.

Hunters Bay and Middle Harbour.—The first inlet which opens to view from the fairway track between Sydney heads, in a W. by N. direction, is the entrance to Hunters bay and Middle harbour, which is one mile within the heads and four-tenths of a mile broad, between Middle head and Grotto point. Nothing, however, should tempt a large vessel to enter Hunters bay when blowing hard from the eastward, as it is then a sheet of broken water, although with depths of 4½ fathoms; this would defy any ground tackle, and smother a laden craft, the draught of which might prevent her crossing the 9 foot bar, between Hunters bay and Middle harbour.

Middle harbour which trends to the north-westward from Hunters bay, carries from 14 to 5 fathoms water for about three-quarters of a mile above the bar; when, after narrowing to a cable in width abreast of Hillery spit, it turns to the westward, into a 16-fathoms estuary, which branches into deep creeks, leading to no settlement or object for traffic, except the firewood upon its banks, which some Sydney lighters find profitable.

MIDDLE HEAD, W.N.W. two-thirds of a mile from Inner South head, is a lofty, precipitous, bold bluff of whitish freestone, immediately facing the entrance of port Jackson. As it is exposed to the ocean swell, the sea breaks upon it with great violence during easterly gales.

WESTERN OBELISKS and LEADING MARK A.—On the western shore, facing the entrance to the Sound, are two white obelisks, each 30 feet high: that nearest the sea is situated at the edge of the first elbow of the coast, immediately to the southward of Middle head; the western, and upper obelisk stands upon the wooded slope, and bears W. ¼ S. from the former. These two kept in line, give the leading mark A, for clearing the South reef and the northern edge of the Bar and Flats.

Obelisk bight is a small bay midway between Middle and George heads

George Head bearing S. by W. ¾ W. three-quarters of a mile from Middle head is 209 feet high; a 3-fathoms shoal extends from George head one-quarter of a mile towards Middle head.

Bradley Point, the southernmost projection of the north shore of port Jackson, lies S.S.W. ½ W. nearly 1¼ miles from George head, and has a shoal spit extending about half a cable to the southward from it. Between George head and Bradley point are Chowder and Taylor bays, separated from each other by Chowder head.

The BAR AND FLATS and SOW AND PIGS, which extend across the actual mouth and threshold of the Sydney and Paramatta estuary, limit the capacity of the harbour to the admission of vessels of 20-feet draught at low water springs through the Western channel; and of 26 feet at low water springs through the Eastern, in fine weather; for if boisterous from seaward, or a gale is coming on from that quarter, the Bar is subject to a swell, which requires an allowance of a fathom scend.

The nucleus of this Bar consists of a group of rocks, showing at half tide, and marked by an iron beacon rod, surmounted by an open hooped ball. This beacon is fixed nearly midway between the shores on either side, and the outer and inner edges of the flats, which spread over two-thirds of a mile North and South, and extend from shore to shore, across the entrance, which is here three-quarters of a mile wide.

Spits of rough ground extend S.S.W. a quarter of a mile, and S. by E. one-third of a mile, from the beacon, with from 11 to 18 feet water upon them; these, with a 16-feet ridge to the westward of them, form Sow and Pigs shoals, which separate the East from the West channel. There is another patch, lying between N. ½ W. to N. by E. a cable in extent East and West, at nearly a quarter of a mile from the beacon, with as little as 18 feet water upon it, and which is the most dangerous shoal upon the Bar, as it lies in the fairway between the Sound and the light-vessel, and is open to the full scend of the ocean swell. This patch, which is the most shallow part of the northern edge of the Bar, separates East from West channel, as the shoals just described to the southward, do in that direction.

SOW AND PIGS LIGHT VESSEL, painted red, is moored in 21 feet water, to the north-westward of the shoals, and nearly one cable from the beacon. The light-vessel shows a *red* flag by day; and two *fixed* white lights, placed vertically 6 feet apart upon one mast, by night. The upper light is 28 feet above the water, and visible from the north-eastward in clear weather, at the distance of 6 miles, bearing between S.W. by W. ¾ W. and S.W. ¾ W.; the bearings being thus limited by Inner South head, to the southward, and Outer North head, to the northward.

The storm signal indicating an approaching southerly gale, will be shown at the Sow and Pigs light-vessel, and at Bradley point, in the same manner that it is shown from the South head.

WEST CHANNEL, which crosses the Bar and Flats on the western side of Sow and Pigs shoals, carries 21 feet at low water, over a sandy bottom: the most narrow part of the channel is between George head and the west extreme of Sow and Pigs shoals, where it is not more than 1¼ cables wide between the 3-fathoms edges of the shoals. The light-vessel is situated so as to render this an available night channel, which may be taken without a pilot, in moderate and clear weather, by any one who has studied the plan and directions.

LEADING MARKS for clearing the shoals on either side of West channel:—

C.—New Wesleyan church spire at Woolomoloo, (nearly on the site of Craigend mill) just open of Bradley point, bearing S.S.W. ¾ W. clears the 18-feet patch on the northern edge of the Bar and Flats, and Sow and Pigs shoals, on their western sides.

Watson Bay.—From Inner South head, the eastern shore of port Jackson trends S. ¾ W. half a mile to Green point, the north extreme of Watson bay. Parsley and Vaucluse bays, which are separated by Vaucluse point, are two small bights forming a southward continuation of Watson bay; the three bays having one common entrance, which is 4 cables across, S.S.W. ¾ W. from Green point to Bottle and Glass spit. Both points of the entrance are closely begirt with sunken rocks; and from Bottle and Glass spit, foul ground borders the shore for nearly half a mile to the south-westward, terminating at Shark point.

Watson bay is the life-boat, and pilot station; and as there is smooth anchorage, in 6 to 7 fathoms water, outward-bound vessels frequently anchor here, to wait for a fair wind.

The Two Eastern Obelisks, which, until the leading lighthouses in the vicinity of Vaucluse bay were erected served for leading into East channel over the Bar and Flats, will not come in sight until a cable and a half within Inner South head; then the northern and smaller of the two obelisks, which is but half the size of the other, will be seen at the high-water mark on Green point. The southern, and taller obelisk is 25 feet high, and stands on the south-east trend of Vaucluse point, upon nearly the same level as that on Green point, from which it bears S. ¼ E., distant a little more than half a mile. These obelisks being constructed of whitish sandstone, are well brought out to view by the thickly wooded background.

EAST CHANNEL.—Now that the entrance of East channel across the Bar and Flats is defined by leading marks, with deeper and much smoother water, it may expected that East channel will be more frequently used; but the necessity for suddenly hauling up at right angles when entering from seaward, with a south-east breeze, is occasionally a disadvantage to this channel. The outer narrows of East channel, where the soundings quickly decrease from 8 to 4½ fathoms, lie between South reef and the north-easternmost 18-feet patch of Sow and Pigs shoals, forming the northern entrance of the channel, which is there nearly a quarter of a mile wide.

Buoy.—A red buoy is moored in 5 fathoms water, at the S.E. end of the Sow and Pigs, for the convenience of heavy draught vessels navigating the Eastern entrance.

Lights and Leading Marks for East channel, and cross mark for the southern edge of Sow and Pigs shoals:—

B.— Two lighthouses have been erected in the vicinity of Vaucluse bay, eastern side of entrance to port Jackson, bearing S. ½ E. and N. ½ W. from each other, and when in line lead through the Eastern channel in not less than 27 feet at low water springs. Each lighthouse exhibits a *fixed red* light.

F.—St. James's church spire, its breadth open of Bradley point, bearing S.W. ½ W., leads clear of the south-eastern 17-feet elbow of Sow and Pigs shoals.

E.—Outer South head lighthouse, its breadth open to the southward of the obelisk, upon the wooded slope near Watson bay, bearing S.E. by E. ½ E. shows that the south-western, or inner edge of the Bar and Flats has been passed.

Port Jackson above the Bar and Flats is so free from dangers, and is so clearly represented on the plan, that a few of the islands and most prominent points, bordering the thoroughfare, need now be only briefly noticed.

Shark Island is small and thickly wooded, of moderate height, and lies E. by S. ½ S. two-thirds of a mile from Bradley point; a spit of foul ground extends nearly a cable from its north-west end and is marked by a small black buoy.

Clarke Island, S. by W. ¼ W. two-thirds of a mile from Bradley point, is similar in aspect to Shark island, but much smaller; and the water is deep round it.

GARDEN ISLAND, which lies nearly one mile to the southwestward of Bradley point, is considerably larger and higher than the others: it may be approached, northward, to half a cable; but a shallow spit runs out from its south point. This island is, with certain ordnance reservations, appropriated to naval purposes. Garden island is about to be converted into a Naval depôt, and works in connection with it are in progress, and a wharf is in course of construction on the south-west side. It is also proposed to reclaim the shallow spit extending from the south end of the island.*

FORT DENISON and LIGHT.—Fort Denison, formerly called Pinchgut islet, lies about a quarter of a mile to the north-westward of the north end of Garden island. This islet, unlike the others just described, is a mass of bare rock and masonry, with a martello tower on its north-east extreme, from which is shown a *fixed red* light, for the more especial purpose of guiding steam vessels and coasters. Vessels from foreign ports are forbidden by the port regulations to pass this lighthouse until boarded by the health officer and other authorities. There is deep water round the islet; but it should not be passed within half a cable, on account of two small spits extending out a short distance from it.

FORT MACQUARIE.—The fort is situated at the north extreme of the point which separates Farm cove from Sydney cove. Shoal water runs out about a cable from the point, the spit being marked by a red buoy.

Time ball.—A ball is dropped from the top of the observatory at Sydney at 1h. 0m. p.m. Sydney mean time. The ball is hoisted half way up as preparatory at five minutes before the signal. When the signal fails in accuracy, the ball is at once hoisted half way up, and kept up for one hour. The amount of error is published in the daily papers.

MAN-OF-WAR ROAD and FARM COVE.—The custom of the port reserves Farm cove for the anchorage of men-of-war; but, as four large vessels could not berth in Farm cove, Man-of-war road may be considered to extend from fort Macquarie to Garden island, as merchant vessels are not expected to anchor within that space.

Farm cove lies immediately to the eastward of fort Macquarie, and directly in front of Government house: it affords good anchorage in 7 fathoms, muddy bottom, with fort Macquarie point and Dawes point in line, bearing W. by N. ½ N., and Government house S.W.

Moorings are laid in Farm cove and off Garden island.

Water.—There is a small camber for boats, inside a jetty on the west side of Farm cove, at about half a cable from fort Macquarie, with a turncock jet of excellent water at the end of the jetty, at which Government boats can, without charge, water at all times of tide; and by warping a vessel in, hoses might be led from the turn-cock into the tanks.

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* Commander W. A. Acland, H.M.S. *Miranda*, 1884.

Kiribilli Point, the most prominent projection on the north shore of port Jackson, to the westward of Bradley point, lies N.N.E. one-third of a mile from fort Macquarie, and nearly in line with Bradley point and Outer South head lighthouse. There is a battery on the point. A rocky spit extends half a cable from Kiribilli point, which, with fort Macquarie spit, reduces this part of the harbour to a quarter of a mile in breadth.

Careening Point and Great Sirius Cove.—The former is a high, narrow tongue of land, extending from the north shore to the centre of the bay, between Bradley and Kiribilli points. Great Sirius cove is a deep narrow creek running up nearly two-thirds of a mile on the eastern side of Careening point, at the head of which is a heaving-down establishment.

The FAIRWAY of port Jackson may be divided into three sections: the first, W.N.W. 1¼ miles from the line of the Outer heads; the second S.S.W. 2¼ miles across the Bar and Flats and up the sea reach to abreast of Bradley point; and the third, which is the harbour reach to Sydney cove, W. ½ S. 1¾ miles, being but a run of 5¼ miles altogether, and which at an eight-knot rate, is to be accomplished, against the ebb, in three-quarters of an hour, and in half an hour with the flood stream.

The first reach, and East and West channels across the Bar and Flats, having already been described, the second reach, thence to abreast of Bradley point, and the third reach now remain to be noticed.

The average breadth of the harbour between the Bar and Flats, and Bradley point, is about half a mile; the soundings in mid-channel ranging from 7 to 16 fathoms, with sandy bottom. Between Bradley point and Shark island, the working room is nearly half a mile, allowing for the rocky spits which project about a cable on either side. Shark, Clarke, and Garden islands may be considered as forming the southern boundary of the fairway channel; but in working, vessels may advantageously make longer boards to the southward, between the islands, towards Rose, Double, and Rushcutter bays. They may also, when past Bradley point, stand to the northward on either side of Careening point, which will afford from two-thirds of a mile to nearly half a mile working room, merely keeping about half a cable clear of the spits extending from the points, to the westward of Bradley point. There is easy anchorage, in 10 fathoms, anywhere in mid-channel. and no tide stream to prevent a smart vessel, under a top-gallant breeze, turning to windward.

The ship channel, at about one-third of a mile above fort Denison, whether leading to Sydney cove, Darling harbour, or to Waterview, or Cockatoo island, is contracted to about a quarter of a mile in width between the points, the narrowest part being between the spits extending from fort Macquarie and Kiribilli points.

It is not here deemed necessary to enter into a detailed description of port Jackson above fort Macquarie, as a vessel having arrived thus far, will be berthed by the Portmaster's directions, according to her destination; and the various commercial localities, and other details of the kind, will be best understood by reference to the Plan.

Sub-marine cable.—Persons are cautioned against anchoring, creeping, dredging, or fishing near the submarine cable between Dawes point and Blues point.

ANCHORAGE.—The Sound only affords temporary anchorage, with off-shore winds, where vessels may wait for a steam-tug, or for a favourable opportunity for crossing the Bar and Flats. But there is good anchorage in Watson bay, and immediately to the south-westward of Sow and Pigs shoals; and, should a vessel be baffled or assailed by those crippling gusts locally known as "southerly busters," or get perplexed as to threading her way amongst the shipping, she can find good anchorage, in not more than 13 fathoms, with good holding-ground, anywhere, in the harbour reach, by merely giving the islets and points a berth of 2 or 3 cables. At night, when anchored in the way of passing vessels, a light is required to be shown.

SYDNEY, the capital and seat of Government of New South Wales, is situated at a distance of 4 miles from the mouth of the harbour. The harbour is not an uniform expanse of water, but is broken up in all directions by steep points jutting out into it forming bays, which are harbours in themselves, and allow the heart of the city to be easily reached from the water.

Vessels drawing 27 feet water can in many parts lie close in shore. This last natural advantage has been greatly utilised, and the water is skirted with wharves, stores, and warehouses. On the western side, where the shores are a little more precipitous, there is also an unbroken line of wharfage, used mainly by the inter-colonial and other large steamers. The Circular quay at the head of Sydney cove has a length of 1,300 feet available for the longest vessels, and the Government are extending the accommodation and convenience. Woolomoloo wharf is 1,200 feet long, but is not suited for large sea-going vessels. The eastern side of Darling harbour, which skirts the western side of the city, has its frontage entirely occupied with wharves and quays as well as extensive stores. Between Miller and Dawes points the space is almost completely taken up by commercial premises.

The approaches to berths, and the process of berthing, are equally simple and these being entirely the business of the pilot and Portmaster, no directions are necessary on that head.

Within the city there are numerous and extensive factories and foundries. Steam ferry boats ply between the city and its trans-marine suburbs. The trade of Sydney is considerable: during the year 1881 the number of British and foreign vessels which entered port Jackson was 1,389, with an aggregate of 973,425 tons. The population of the city proper by the census of 1881 was 99,670 ; of the suburbs, 120,757, a total of 220,427.

DOCKS, PATENT SLIPS, and CAREENING ESTABLISHMENTS. — Every facility is to be obtained at Sydney for repairing vessels of any size or description, with abundant supplies and stores of every kind.

Fitzroy Dock is the Government dry dock at Cockatoo island, at about 2 miles above Sydney cove. The dock is about 410 feet long, and 83 feet wide at the entrance, with a depth of 21 feet over its caisson-sill, at high water, springs, and 20 feet neaps.*

The establishment is provided with the largest, most powerful and recently improved machinery, but all warps and necessary labour for docking must be provided by the ship about to be docked.

A grant of 150,000*l.* has been voted for a much larger graving dock at Cockatoo island. The length will be 630 feet, and the width 108 feet. The depth of water over the sill will be 28 feet at neaps and 30½ feet at springs. The width of entrance 84 feet.

Morts Dock is a private dry dock in the bight of Waterview bay, on the south side of the harbour, at about 1½ miles above Sydney cove. This dock is 365 feet long and 68 feet wide at the entrance, with a depth of 19½ feet at high water, springs, and 17½ feet at neaps, over its sill: like Fitzroy dock, it is pumped out by steam-power.

There is also a patent slip available for vessels of 1,000 tons, the length of carriage is 200 feet.

Pyrmont Patent Slip, at Darling point, on the western side of Darling harbour, belongs to the Australian Steam Ship Company. It is 850 feet long, 400 feet of which incline beyond low water mark into 28 feet depth, and it carries a cradle 190 feet long, upon ways 36 feet wide. The engine power is capable of hauling up a vessel of 2,000 tons in 5 hours.

Towns and Darleys Patent Slip is a smaller, but much used patent slip, situated on the eastern shore of Darling harbour. It is about 400 feet long, with its extremity 15 feet under water, carrying a cradle 21 feet wide, and worked by an adequate engine.

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* The Pacific Mail packets, 400 feet long, are frequently docked here.—Remark book. Navigating Lieutenant, W. Petley, H.M.S. *Alert*, 1881.

There are also two floating docks, one capable of receiving vessels of 250 tons; and the other, vessels of 500 to 600 tons, and not exceeding 160 feet in length, or 10 to 12 feet draught.

Vessels are occasionally hove down to the wharves in Darling harbour, and likewise in Great Sirius cove.

Steam Tugs.—There are steam tugs at Sydney, which may be summoned by signal when required. Usually one or more of these are in waiting for vessels outside the heads.

PILOTS.—The pilot station at Watson bay, is within half a mile of the signal station on the Outer South head, and a constant look-out is kept at the Signal tower, from which the night signals of vessels requiring pilots will be answered by showing a blue light.

The master of every vessel not by the colonial regulations exempt from the necessity of accepting the services of a pilot is to place her in charge of the first licensed pilot that may come alongside; and such master is not to enter the harbour or proceed to sea, or quit his anchorage without having a licensed pilot on board, under penalty equal to the amount of pilotage to which he would have been subject if a pilot had been employed. The pilot who brings the vessel into port will be entitled to take her to sea.

Pilots Steam Vessel.—A steam vessel with pilots onboard is stationed off Camp cove. Upon a vessel being reported in sight, the steam vessel will at once proceed to sea, and having placed a pilot onboard, will return to her moorings. The pilot steam vessel may be distinguished by her flag of white and red, horizontal stripes by day, and at night by the burning of a flash light every 10 minutes. If the state of the sea will not admit of a pilot being put on board from the steam vessel, she will lead the way into smoother water between the heads, where tugs will be in attendance.

Harbour Dues payable to the Harbour master for repairing on board, and appointing the place of anchorage, for ships or vessels entering any port or harbour in New South Wales, and for each removal of the same from one place of anchorage or mooring to another, not being for the purpose of leaving the port (vessels registered in Sydney under 50 tons, or while employed in the coasting trade from one port of New South Wales to another, excepted):—

	£	s.	d.
For every vessel under 300 tons	1	0	0
„ of 300 tons and under 400 tons	1	5	0
„ 400 „ 500 „	1	10	0
„ 500 „ 600 „	1	15	0
„ 600 „ 800 „	2	0	0
„ 800 „ 1000 „	2	5	0
„ over	3	0	0

Mail Packets.—The Peninsula and Oriental, the Orient company, the Californian Mail line, the Compagnie Messageries, and the Australian Steam Navigation Company have establishments at Sydney. The interval occupied in making the passage between London and Sydney and *vice versâ* by the Orient line is from about 48 to 50 days.

Gunpowder.—Vessels arriving with gunpowder on board, exceeding the quantity they require as stores, are to hoist a Union-jack at their main, and are not to proceed higher up the harbour than Neutral bay until the gunpowder is landed according to law ; and vessels taking gunpowder on board are not to do so, higher up than Neutral bay, under penalty in each case of 10*l.*

All vessels arriving with gunpowder on board are immediately to report the same to the Collector of Custom and Ordnance Storekeeper, the latter of whom is to grant a permit for the removal thereof to one of Her Majesty's magazines as early as possible.

All vessels are required (with penalty for non-compliance) to land at the Government magazine whatever gunpowder they have on board, whether as cargo or stores, before they enter Sydney cove or Darling harbour.

Port Regulation.—No ballast, rubbish, gravel, earth, stone, wreck, or filth is to be thrown from any boat or vessel in the harbour of port Jackson, or into any creek or river within the limits thereof, excepting only on land where the tide or water never flows.

WINDS and WEATHER.—From the early part of October to April, the coast in the vicinity of port Jackson, is subject to tolerably regular sea and land breezes, the former blowing from N.E., and the latter from the westward. The sea breeze generally begins at 10 A.M., and subsides after sunset; the land wind commences at about midnight, and continues until 8 A.M. The exceptions to this rule are north and south winds, which occasionally prevail, as do also the north-west hot winds ; these latter, after blowing for a period varying in duration from 12 to 72 hours, are usually succeeded by sudden violent gusts from S.S.E. to S.S.W., which generally settle into a gale from those quarters, accompanied with rain. The greatest vigilance exercised by masters of vessels possessing local experience, is frequently insufficient to prepare for the suddenness with which these gusts overtake them; strangers, especially, should therefore be particularly careful to be ready for the change during the time when the hot winds are blowing, or the brief calm which sometimes intervenes.

From April to October, after the gales which usually succeed the autumnal equinox are over, and before those which generally precede the spring equinox commence, the wind prevails strong from the westward, between N.W. and S.W., with fine clear weather, and occasional gales from the North and South, with rain.

Except during the equinoctial gales, the wind rarely blows on shore with sufficient violence to endanger the safety of a well-appointed vessel; but in the spring equinox, when these gales set in from S.E. to East, accompanied with dense rain and a high barometer, they blow with great fury from 24 to 48 hours, and finish with a long, slowly declining gale from South to S.W.

The Barometer is, with local knowledge, of great assistance in showing the approach of bad weather; but it must not be implicitly relied on by strangers. As a general rule, the barometer stands low with westing in the wind: lowest with a north-west; high with easting in the wind; and highest in south-east gales. The greatest mean height takes place in August and September, with S.E. and southerly winds; and the lowest mean height in December, January, and February, with N.W. winds.

The ordinary rotary changes of the wind are from North, veering to the westward; when the contrary is the case, such as from N.E. to East, and veering to the southward, bad weather may be looked for. After the strength of a south-west or southerly gale is over, the barometer will rise to about 30 inches, when fine weather and a gradual change of wind to the N.E. may be expected.

Fogs rarely occur, except in the summer months, and then seldom last longer than from day dawn to 10 A.M. When the sea breeze is blowing it is accompanied by a thin haze, which envelopes the land and renders it indistinct; this haze is dispersed as soon as the land wind springs up.

Storm Signals.—The existence of gales which are likely to endanger shipping will be signalled at the principal telegraph stations on the coast of New South Wales, in the following manner, viz.:—

The signal staffs will support two yards, which are to cross each other at right angles in the direction of the cardinal points of the compass, the yard-arms denoting respectively North, South, East, and West; midway between North and East will denote N.E., &c., &c.

A violent squall will be represented by a conspicuous diamond-shaped signal.

A heavy sea will be represented by a drum-shaped signal.

Gale, with clear weather will be represented by a diamond-shaped signal over a drum.

Gale, with thick weather and rain, will be represented by a diamond-shaped signal, and a drum over it.

The direction from which the gale is blowing will be indicated by the particular yard-arm between which and the mast-head the geometrical signal is suspended.

DIRECTIONS.—The most unfavourable times for entering port Jackson are in easterly gales, southerly gales, and light variable winds, with a ground swell rolling in upon the heads.

Easterly gales sometimes blow very hard, causing a heavy sea upon this coast, which not only breaks with great violence upon Sydney heads, but occasionally right across the entrance, and directly home to Middle head; a vessel, however, scudding in, must approach within 3 cables of Middle head, at the risk of being swept upon it by the hurling sea whilst hauling up, almost at right angles, to cross the Bar and Flats, and weather George head, upon which also the sea breaks. Easterly gales are frequently attended by haze-banks, which might prevent the lights being seen at night, until too late for a vessel to claw off the land; vessels should therefore, day or night, keep the sea rather than bear up for port Jackson in a gale from the eastward, and should not approach the coast within 10 miles, at which distance Inner South Head light, if seen, will be dipping, and the soundings will be 70 fathoms, dark sand. It must be borne in mind, when getting an offing, that the weather gauge will be to the north-eastward as the gale expends itself, and that in standing to the northward the vessel is safe as long as Outer South Head light is not shut in by Outer North head, which it will be, upon the bearing of S. by W., and then the soundings will begin to shoal to about 20 fathoms, within which line no vessel should approach the coast.

The southerly gales are strong squally winds, which rush down the harbour, and frequently embarrass sailing vessels when working up between the heads, sometimes taking them aback, and exposing them to destruction against the North Head cliffs; vessels should therefore wait outside until the wind becomes more steady, unless she is in very good working order and the flood stream is in her favour.

Vessels should not attempt to enter between the heads with light variable winds, as, under such circumstances, they frequently become unmanageable, and, being left to the mercy of the ground swell, may be set upon either of the heads: therefore it would be advisable to anchor and wait for a steady breeze, or summon a steam tug, before getting too near the heads.

If a vessel bound to port Jackson should, from want of observations, be uncertain of her latitude, and fall in with the land either to the southward or the northward of it, in blowing weather, she may find shelter in Botany bay, to the southward, or Broken bay, to the northward, according to circumstances.

Vessels approaching port Jackson in the night with southerly or westerly winds, should keep the sea until daylight; but with winds from the northward or eastward, and favourable weather, they may safely enter.

Botany bay, as already described at page 602, lies about 10 miles to the southward,[*] and Broken bay lies 16 miles to the northward[†] of port Jackson; and it is of the utmost consequence that such vessels as may happen to be in bad condition, and unable to keep off shore, should be aware of these useful places of refuge.

SOUNDINGS have been accurately ascertained within the range of the revolving light; and will prove a valuable assistance in nearing the land in thick weather. East of the entrance of port Jackson, at 18 miles off shore, the depth will be 100 fathoms, olive sand, from which it shoals regularly to 20 fathoms, close in with the land and with the entrance. To the northward of the port, 100 fathoms will be found farther off shore; and, on the contrary, to the southward, this depth does not extend more than 15 miles; the 100-fathoms edge of the sounding describing a serpentine line from lat. 33° 30′ S., long. 152° 0′ E., to lat. 34° 11′ S., long. 151° 28′ E.[‡]

To ENTER PORT JACKSON from the SOUTHWARD.—When coming from the southward, if the weather be dark or thick, preserve a good offing until the Sydney heads or Outer South head lighthouse be seen, in order to clear the projection of the coast about Botany bay, where it is comparatively low, and where the current sometimes sets S.W., towards the shore.

Having clearly made out the Sydney heads, and being abreast of Outer South head, if the wind be fair, steer to the north-westward, taking care not to bring Outer South head lighthouse to the westward of Gap bluff, in order to clear South reef; but as the sea generally breaks upon it, it may easily be seen, and with a commanding breeze, may be passed in 8 fathoms, at a cable off. Soon after opening Middle head, to the northward of Inner South head, with the latter bearing S.W., pick up the leading mark A, by getting the two white obelisks on the western shore in line, bearing W. ½ S., which will clear the South reef and the 18-feet patch on the northern edge of the Bar and Flats.

West Channel.—Steer in upon the leading mark A, until the New Wesleyan church spire is nearly in line with Bradley point, bearing S.S.W. ¾ W.; this will be the leading mark C, to which the course must now be altered, and this will lead through West channel, clear of Sow and Pigs shoals, passing at about 1¾ cables to the westward of the light-vessel. The soundings, when passing the 18-feet patch on the northern edge of the Bar and Flats, will decrease from 7 to 5½, and then to 3½ fathoms, which will be the depth until through West channel, when the water will quickly deepen to 10 fathoms, as Outer South head lighthouse opens its breadth to the southward of the red and white chequered obelisk below it (mark E), bearing S.E. by E. ¾ E.

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[*] *See* Admiralty plan of Botany bay and port Hacking, No. 2,179; scale *m* = 2 inches.

[†] *See* Admiralty plan of Broken bay, No. 2,166; scale *m* = 2 inches.

[‡] An extensive bank with 20 fathoms water on it, which has been named Jerusalem bank, is reported to lie 40 miles from the land, and about the same distance south-east of the entrance to port Jackson, in lat. 34° 20′ S. long. 151° 54 E′. *See* page 605.

The Bar and Flats being now cleared, steer S.S.W., passing between Bradley point and Shark island; round the point at the distance of about a quarter of a mile, to clear the spit extending from it, and then proceed westward for Sydney.

In working through West channel, the deepest water will be found on the western shore, with the exception of the 17-feet shoal extending north-eastward from George head, already mentioned. Avoiding this shoal, the western shore may be made free with to the distance of half a cable; but in standing over to the eastern side, northward of the light-vessel, the 18-feet patch on the northern edge of the Bar and Flats must be cautiously avoided, by not allowing the light-vessel to bear to the westward of S. by W. ¼ W.

Abreast of George head, West channel is contracted to little more than 1½ cables' width by the 16-feet ridge forming the south-west extreme of Sow and Pigs shoals; to clear this, the obelisk on the south slope of the North head promontory must be kept a little open to the westward of the light-vessel, until Outer South head lighthouse is open at least its own breadth to the southward of the chequered obelisk below it, when the Bar and Flats will have been passed.

Vessels of heavy burthen, or drawing more than 18 feet, ought not, with a fresh wind, to attempt to work through either of the narrow channels across the Bar and Flats; but vessels of lighter draught than 14 feet, can stretch right across from shore to shore, North of the light-vessel, passing over the 18-feet patch, on the northern edge of the Bar and Flats, and that portion of Sow and Pig shoals lying to the southward of a line from George head to the obelisk on Green point, which bear nearly East and West from each other.

A vessel of war, if bound for Man-of-war road, should, when abreast of Garden island, haul up between it and fort Denison, if proceeding to Garden island anchorage, when she may come to in 7 fathoms, with Inner South head lighthouse in line with the north extreme of the island.

For Farm cove, haul in between fort Denison and Lady Macquarie point taking care not to close Outer South head lighthouse with the north bluff of Garden island, and anchor, in 6 fathoms, between fort Macquarie and Lady Macquarie point.

In proceeding to the Government dock at Cockatoo island, it is only necessary to keep in mid-channel, until off Balls head—about a mile above Sydney cove—where attention is called to a 19-feet patch, half a cable in diameter, lying in mid-channel between Balls head and Longnose point; to clear which to the southward, Dawes battery flag-staff should be kept a little open of the water-police station, at the north extreme of Goat island, taking care, after passing the patch, to avoid Longnose point by keeping Blues point just shut in by Balls head. Then, after clearing Longnose point, steer for Cockatoo island, at the south-east elbow of which is Fitzroy dry dock, denoted by the steam-engine chimney.

East Channel.—A vessel should pick up leading mark A, as already directed, and, proceeding on this mark, look out upon the port beam for the two lighthouses in the vicinity of Vaucluse bay, as these lighthouses come in line—leading mark B—haul up for them S. ½ E., carefully preserving their line, the locking of Outer North, and Inner South heads will indicate having entered the narrows. When drawing in abreast of Camp cove, between Inner South head and Green point, steer S. by W.; taking care not to open the sea-mark obelisk on the south slope of North head promontory after once closing it with Inner South head, until St. James church spire is its breadth open to the southward of Bradley point—leading mark F—bearing S.W. ½ W., which will lead clear of the south-east extreme of Sow and Pigs shoals, and to the southward of the red buoy at the S.E. end of Sow and Pigs.

By Night from the Southward.—A vessel from the southward being abreast of, or at about three-quarters of a mile to the eastward of Outer South head revolving light, with Inner South head fixed light well open of Gap bluff, bearing N.W., should steer N.W. by N. until Inner South head light bears S.W., by which time the floating light should be well open upon the bearing S.W. by W. ½ W.; then steer West, which will clear South reef and the 18-feet patch on the northern edge of the Bar and Flats, rounding the breakers on the former, at the distance of a cable, in 9 fathoms. If bound through the West channel,—when the floating light bears S.S.W. steer S.W. by S., passing at about a cable to the westward of the light-vessel; continue this course until Outer South head light bears E.S.E., when the Bar and Flats will have been passed, and the vessel may anchor in 9 fathoms with Outer South head light bearing E.S.E., and the floating light N. by E.

Or, in fine weather, by keeping a sharp look-out, a vessel may proceed to abreast of Sydney, first steering S.S.W. until Outer South head light bears nearly E. by N. ½ N., and the red light on fort Denison West; then steer West for the red light, which may be passed on either side, at the distance of a cable, and by bringing it astern in line with Outer South head light, bearing E. by N., the vessel will clear fort Macquarie spit, and may anchor in Sydney cove, in 7 fathoms, mud.

A vessel of war going to any part of Man-of-war road, should, from abreast of Bradley point, steer westward towards fort Denison light, and, when north of Garden island, haul in to the southward, between it and the fort, if bound for Garden island anchorage, which will be entered as soon as Outer South head light is shut in by the northern bluff of the island, bearing E. by N. ½ N.

If bound for Farm cove, and any vessel which might be lying there can be discerned, proceed to the westward, between fort Denison and Lady Macquarie point, taking care in passing that point not to close Outer South head light with Garden Island bluff; a good berth may then be picked up, in 8 fathoms, mud, with fort Macquarie bearing about West, and fort Denison N.E.

If intending to use the East channel, after clearing South reef, continue the west course until the two leading fixed red lights in the vicinity of Vaucluse bay come in line bearing S. ½ E., which will lead through East channel in 27 feet at low water spring tides.

From the EASTWARD.—A vessel proceeding for port Jackson from the eastward, will find the latitude (33° 50′ S.) the best guide for making the port. When the heads are clearly distinguished, bring Middle head which faces the entrance, to bear West, and steer for it upon that bearing, until the Western obelisks, immediately to the south-westward of Middle head are made out; then get them in line, bearing W. ½ S., and having thus picked up leading mark A, and cleared the South reef, haul up for crossing the Bar and Flats by West or East channel, as most convenient, and proceed as directed when entering from the southward, at page 625.

At Night, as in the daytime, the latitude must be in great measure depended upon for making port Jackson from the eastward, until Outer South head revolving light, and afterwards Inner South head fixed light are distinguished. When Inner South head light first becomes visible, it appears dipping at the distance of about 10 miles from the land, the soundings being 70 fathoms, dark sand, and when at about 5 miles off, the depth will be 50 fathoms, fine sand.*

When Inner South head light is distinctly visible, steer for it upon a West bearing, until Outer South head light bears about S.S.W.; then alter course to W. by N., so as to make sure of clearing the dangerous South reef; and when Inner South head light bears S.W., distant about a quarter of a mile, and the floating light is well open, bearing S.W. by W. ½ W., steer West again, round the breakers on South reef at the distance of a cable, in about 9 fathoms water, and when the floating light bears S.S.W. steer S.W. by S., through West channel, passing at about a cable on the west side of the light-vessel. When Outer South head light bears E.S.E. the Bar and Flats will have been passed, and the vessel may anchor or proceed up the harbour, as directed at page 621.

If bound through East channel, after passing South reef in about 9 fathoms, bring the two red fixed leading lights in the vicinity of Vaucluse bay in line bearing S. ½ E., and proceed through the channel with them kept so.

From the NORTHWARD.—No especial directions are required for vessels proceeding into port Jackson from the northward in the daytime, as those already given for entering from the eastward, at page 623,

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* If, when running in upon a westerly bearing of Inner South head light, the land be too indistinct for cross bearings, the vessel's approximate position may be readily ascertained by a sextant angle, between Inner and Outer South head lights, the corresponding distance being found in the following table :—

Bearing of Inner South head light.	Angle between Inner and Outer South head lights.	Distance from Inner South head light.	Distance from Outer South head light.
	° ′		
W. by S.	15 15	5 miles	5 miles
	18 45	4 "	4 "
	24 30	3 "	3 "
	35 00	2 "	2 "
	57 45	1 "	1⅓ "
West.	15 00	5 "	4¾ "
	18 45	4 "	3¾ "
	25 15	3 "	2¾ "
	37 00	2 "	2 "
	65 00	1 "	1¼ "
W. by N.	14 00	5 "	4½ "
	18 00	4 "	3½ "
	24 45	3 "	2½ "
	39 00	2 "	1½ "
	73 00	1 "	1 "

will answer every purpose, taking care to give Outer North head a good berth, especially with a light wind and a ground swell.

At Night from the Northward.—A vessel from the northward entering port Jackson by night, has merely to keep Outer South head light to the westward of S.S.W. ½ W., to give her a half mile clearance to Outer North head, and looking out for the entrance, the quickly successive opening of Inner South head light, bearing S.W. ¼ W., and the floating light S.W. ¾ W. will indicate the vessel being nearly a mile to the eastward of the North head promontory; and it is rarely so dark but that the black towering North head will show when to steer W. by S. ½ S., for the entrance between the heads, which should be done just as the floating light comes on with Inner South head, bearing S.W. by W. ¾ W., remembering that North head will be cleared as long as the floating light is not opened to the northward of Inner South head. Continue a W. by S. ½ S. course, in not less than 9 fathoms, as South reef and the northern edge of the Bar and Flats are being passed, until the floating light bears S. by W. ¾ W., then steer S.W. by S. through West channel, passing at about 1¾ cables to the westward of the light-vessel. When Outer South head light bears E.S.E., the vessel may anchor, or proceed up the harbour, as directed at page 623.

If bound through East channel, after clearing South reef on the W. by S. ½ S. course, continue on it until the two fixed red lights in the vicinity of Vaucluse bay are in line bearing S. ½ E. which kept so will lead through East channel in 27 feet at low water.

WORKING into PORT JACKSON.—A westerly wind, although a leading wind across the Bar and Flats and up port Jackson, as far as Bradley point, blows right out of the entrance; but there is ample working room for a well-handled vessel between the heads, the shortest board being half a mile, between South reef and Inner North head; and, should it be ebb stream, it may be evaded by always tacking to the southward directly the light-vessel opens to the northward of Inner South head, until having worked up as close to South reef as brings the signal tower on Outer South head to touch Gap bluff, bearing S. by E. ¾ E., upon which line the vessel may stretch to the northward, clearing South reef at a cable distant, and then haul close up on the port tack, directly the light-vessel opens to the south-westward. Here the ebb stream will catch the vessel on the weather quarter; but as she reaches across towards the North harbour its strength, of 1½ knots, will be avoided.

It should be here stated that immediately outside the Bar and Flats, the ebb stream sets to the north-eastward, towards Inner North head, and then E.S.E. along shore, towards Outer North head, leaving the space from the line of the Outer heads to Inner South head, in slack water during the ebb.

Caution.—To ensure success in working in, and to avoid mishap, smart working, and readiness with both anchors will be absolutely necessary to cope with flaws and gusts of wind, as well as the ground swell, which perplex even those who frequent port Jackson.

TIDES.—It is high water, full and change, North head, at 8h. 15m., springs rise 6 feet; and at Sydney at 8h. 38m., the rise at ordinary springs being 4¾ feet, and at neaps 4 feet.

Between April and October the night tides are higher than the day tides at Sydney, and between October and April the day tides are the higher.

In the offing, within the line of the currents, the ebb sets to the southward and the flood to the northward. Outside the Bar and Flats, as just stated, the ebb sets across the Sound, towards the Inner South head, and then about E.S.E. close along shore in the direction of the Outer North head, leaving all the space between the line of the Outer heads, and the Inner South head, in slack water, as regards the ebb stream. The ebb and flood streams set fairly across the Bar and Flats, N.E. and S.W., and up the harbour, partake of the mid-channel trends; the ebb from Shark island to the Bar and Flats setting N.E. and the flood S.W.; and above Bradley point the ebb stream East, and the flood West; the maximum rate of the ebb being 2, and of the flood 1½ knots.

CHAPTER IX.

WINDS AND CURRENTS.—DIRECTIONS FOR THE ROUTES BETWEEN CAPE LEEUWIN AND SYDNEY; ALSO FROM AUSTRALIA TO CAPE OF GOOD HOPE, AND TO CAPE HORN.

The general remarks and directions in the Introduction to this volume having pointed out the most desirable route from the cape of Good Hope to cape Leeuwin, the description, in this chapter, of the winds and currents on the southern coasts of Australia will be followed in consecutive order, by Sailing Directions, eastward and westward, between cape Leeuwin and Sydney, with brief directions for the routes recommended from Australia westward, to Mauritius and the cape of Good Hope, and eastward to cape Horn.

WINDS near CAPE LEEUWIN and to BASS STRAIT.—Near cape Leeuwin the wind blows generally from the westward, varying in summer from N.W. in the night, to S.W. in the latter part of the day, though not with regularity. Both here and off the south coast of Australia, as far as Bass strait, the strongest and most durable winds blow from the south-westward, causing a long and incessant swell, from April to November, when the weather is generally very unsettled and tempestuous, and gales at S.W. are frequent, varying sometimes between S. by W. and N. by E. During the months of December, January, and February, easterly winds may be expected.

Captain Flinders remarks:—"The progress of the gales is usually this: the barometer falls to 29½ inches, or lower, and the wind rises from the north-westward, with thick weather, commonly with rain; it then veers gradually to the westward, increasing in strength, and generally clearing up as soon as it obtains any southing. At S.W. the gale blows hardest, and the barometer rises; and by the time it reaches South or S.S.E. it becomes moderate, with fine weather, and the barometer above 30 inches. Sometimes the wind may back round to West, or something to the northward, with a fall in the mercury, and with diminishing strength, or perhaps die away; but the gale is not over, although a cessation of a day or two may take place. In some cases the wind flies round suddenly from N.W. to S.W., and the rainy thick weather then continues a longer time."

WINDS on the SOUTH COAST.—In the Great Australian bight, between the archipelago of the Recherche and cape Northumberland, from the middle of January to the middle of April, the prevailing winds are moderate between S.E. and E.N.E., partaking of the nature of sea and land breezes, and attended with fine weather; but westerly winds and south-west gales have occasionally been experienced in this space during the above period, though the latter are said seldom to blow home on the coast. In the summer the wind generally revolves with the sun; a change to the southward being at all seasons preceded by a rise in the barometer, and winds from the opposite quarter being foretold by its fall.

Northerly or N.N.E. winds are as a general rule followed by a change to West and S.W. winds.

The Barometer is always of great service on the southern coast of Australia, warning the navigator to get an offing when it falls with unusual rapidity, and thick weather accompanies an increasing breeze from the south-westward, as a south-west gale may then be expected, and often comes on without much previous notice. The medium height is about 30 inches for fine weather or steady wind, and it seldom falls below 29½ inches.

The WINDS and WEATHER in BASS STRAIT are similar to those which are met with along the whole of the south coast of Australia, except towards its eastern part, where they partake of the nature of those on the east coast, and the strongest gales blow frequently from between South and S.E., and are accompanied by thick weather and often by heavy rain. In Bass strait appearances favour the theory that the strongest winds come from the S.W., but it is not so. A northerly wind is, however, common both in summer and winter, and preponderates over all others both in frequency and force, more especially during the winter months.* Next in force come south-westerly and southerly winds. The north wind of the Victorian coast is generally a north-west wind in the vicinity of cape Howe. In January, February, and March easterly winds with fine weather seem to be not uncommon, but there is no dependence to be placed on them at any other season. At the eastern side of the Strait and of Tasmania, it is not unusual to meet a north-east wind, though it seldom blows strong.

As the western part of the Ninety mile beach is approached, easterly gales are not so generally felt, Wilson promontory appears to be the divisional line.

Captain Stokes says that January and February are the best months for making a passage to the westward through Bass strait, although easterly winds blow on some rare occasions at other times; but these are mostly gales, and generally terminate in a breeze from the opposite quarter, having much the character of a rotary gale. The gales that chiefly prevail in the strait begin at N.N.W., and gradually draw round by West to S.W., at which point they subside; if, however, the wind, before it has so much southing, veer again to the northward of West, or backs, the gale will continue; but its duration may be told by the barometer, as it is seldom fine when it registers less than 29·95, and bad weather is certain if it falls to 29·70.*

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* Northerly winds being off the land are not so much felt or dreaded. In fine weather a light northerly wind is frequently found near the shore, though light southerly outside. Staff Commander H. J. Stanley, R.N.

Staff Commander H. G. Stanley remarks,—"While surveying Banks " strait, I carefully compared Victorian weather with that which we were " experiencing and found no important difference. Whenever its character " was decided, it was identical."

Thick weather accompanying a breeze from the south-eastward, especially in the winter months, from May to September, is generally the precursor of a gale, and should be regarded accordingly.

WINDS and WEATHER on the WEST COAST OF TASMANIA.—The prevailing winds are from S.W., and bring much bad weather, especially in the winter months of June, July, and August. N.W. and westerly gales also are not unfrequent. An experienced resident in that country has observed:—" Whenever the wind veers round to the S.E., or is easterly, it is a certain intimation of fine weather; but whenever the wind shifts against the sun bad weather is sure to follow. Mariners sailing along the coast will, therefore, do well to pay attention to the state of the wind, which affords almost infallible prognostics of good or bad weather."†

Barometer.—The same laws, with perhaps few exceptions, govern the natural phenomena both off the South coast of Australia and off the West coast of Tasmania. The following extract from a journal kept by an officer of H.M.S. *Bathurst*, on her passage from the South coast of Tasmania to King George sound, in October and November 1822, may prove useful in showing the nature of the winds and weather which may be expected to the westward of Tasmania at this season of the year, and, the reliance which may be placed on the marine barometer, for its indication of any changes: "At sunset, 8th of October, passed the Mewstone, with a fine breeze from the north-eastward, and steered West; but before midnight the barometer had fallen from 29¾ to 29¼ inches, the wind became light, and was afterwards squally, with heavy threatening weather. Before dawn, on the 9th, the sloop was under close-reefed topsails, the wind having chopped round in sudden squalls from N.E. to the N.W., in which quarter it remained for three days, blowing strong and squally with the barometer below 29½ inches.

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* Stokes' "Australia," vol. ii. p. 495.

† Mr. G. W. Evans, Surveyor-General at Tasmania, in his Geographical, Historical, and Topographical Description of it, p. 51.

"On the 11th it fell to 29·33, and the wind inclined westerly and S.W. On the morning of the 13th the mercury attained an elevation above 29½ inches again, and continued to rise, while the wind veered round to the S.W. and southward, attended with thick cloudy weather, frequent squalls, and rain; in the evening it was at 30 inches, with a fresh breeze from the S.S.E. In less than 24 hours the wind had veered round by East (in its usual way) to North, and the mercury, which had reached the height of 30·15 inches, then began gradually to descend. At noon on the 16th, being in lat. 40½° S., long. 134½° E., it had fallen nearly to 29¼, and we had another fresh breeze from W.N.W.; in which quarter, and from the S.W., it prevailed in nearly the same way till towards the latter end of the month, when we had some moderate weather, and the barometer maintained an average height of about 30 inches.

"A more northerly route was then attempted, but the same series of hard gales from W.N.W. and heavy squalls again obstructed our progress. On the morning of November 1st the barometer was at 29·20, and in 12 hours fell a quarter of an inch, when the wind had shifted from W.S.W., and blew a gale at N.W.; in less than 12 hours afterwards it had fallen to 29·35, and we were under reefed storm-staysails, with a hard gale between W. by N. and W. by S., accompanied by severe squalls; but in an equal space of time the mercury rose with rapidity half an inch, the gale veered southerly, moderated, and was succeeded by light winds from the S.W. and N.W. for two days, with the barometer at 30 inches. The sloop was then about 100 leagues to the E.S.E. of King George sound, and made Termination island, the southernmost of the Recherche archipelago, on the 6th, with moderate south-west winds, and barometer above 30¼ inches. An easterly breeze, by which these were succeeded, having veered round to the S.W., contrary to its usual routine, the barometer fell to 29¾, and we had another gale from the westward, which retarded our arrival in King George sound till the night of the 10th of November, after a tedious and boisterous passage of 46 days from port Jackson."

WINDS and WEATHER on the COAST of NEW SOUTH WALES.—The prevailing winds between cape Howe and port Jackson are from the N.E. in summer, and from the westward in winter. But there are occasional gales from S.W. as well as strong breezes from between North and E.N.E., bringing rain with thunder and lightning; these, however, are usually of short duration. Very oppressive hot winds from N.W. sometimes blow fiercely in the summer, and are invariably followed by a sudden shift from between S.E. and S.S.W., and against which vessels near the coast should be particularly guarded, as the first gust is generally very violent, and apt to occasion damage, unless due precautions have been taken. The effect of these sudden changes is so great, that Captain Flinders says he has seen the thermometer at port Jackson descend from 100° to 64° in less than half an hour.

Besides the sudden changes from N.W. to southward, a change from N.E. to South is very frequent in the summer, and generally happens after some days of north-east winds. These changes, as a rule, may be foreseen by clouds rising in the South, with lightning. Sometimes, however, very little warning is given, as the shift of wind may happen with a cloudless sky.

Although southerly winds are more frequent in the winter months than in summer, they occasionally blow three or four successive days in the summer: the southerly wind is inclined to draw off the land at night, from a S.W. or even a W.S.W. direction, especially during the winter months, and is always felt to have more westing in it the nearer a vessel approaches the land.

In the winter season, from May to September, the cold western winds are most prevalent, and are generally accompanied with fine weather and a dry atmosphere; the gales come from the eastward between N.E. and South, and bring rain with them; indeed there is no settled weather in the winter with any winds from the sea, and even with north-west and north winds, there is frequent rain, though they are usually light when in that quarter.

Land and sea breezes are not frequent, but are met with occasionally, during the spring and autumn months: in the height of summer the north-east wind springs up from a calm early in the forenoon, and subsides at about midnight; a slight draught off the land being occasionally felt close inshore between these intervals.

A heavy dew in the night is invariably an indication of a north-easter the following day.

The north-east or sea-breeze is subjected to variations of strength and character. Sometimes it blows a steady gale for three or four days, veering from North to N.E. in squalls. When likely to be of this duration, it sets in with thick, overcast weather; and increasing in strength, is accompanied with gloomy dense clouds and heavy rain, and an atmosphere with all the characteristics of a thick fog, so that objects during the squalls are not distinguishable at a distance of a quarter of a mile.

Easterly gales are not very frequent; but from the scarcity of harbours on this coast, they are much dreaded by coasters: the worst of these gales is their being generally unsteady in direction, veering from N.E. to E.S.E. in squalls. June, July, and sometimes August, are the months in which these gales are felt in their full violence. A well-appointed ship, however, if not embayed, may generally maintain an offing by keeping on the starboard tack, thereby having on her lee bow the current, which almost always sets to the southward.

Mr. John Ross, harbour master at Moruya river, says:—"The gales of wind that have occurred during the last year, to which my attention has been particularly directed, have been marked by the rotary character so well known to prevail in the South Pacific and Indian oceans. They commence at North or north-eastward; the mercury falls, the wind freshens, and veers to the N.W.; the mercury begins to rise, the wind becomes South, then S.E., when, after a six hours' blow—seldom more than 12 hours—the breeze is over, and is generally succeeded by some days of fine weather, with a high barometer. With the south-east portion of the gale, the sea comes in on the East coast, and there is the highest sea on this bar. In fine weather, after the gale has passed, a strong southerly wind sometimes blows for a few following days, dropping about sunset and freshening again after sunrise: this is always the forerunner of fine weather for some time."

The Barometer will be of singular advantage; for if the weather be tolerably fine, and the mercury do not stand above 30 inches, there is no probability of danger; but when the mercury much exceeds this elevation and begins to descend, and the weather is becoming thick, a gale from S.E. to East is to be apprehended, and a vessel should immediately obtain a proper offing. With respect to the rise and fall of the barometer, it may be taken as a general rule upon this East coast that a rise denotes either a fresher wind in the quarter where it then may be, or that it will veer more to seaward; and a fall denotes less wind, or a breeze more off the land; moreover, the mercury rises highest with a south-east and falls lowest with a north-west wind, and N.E. and S.W. are the points of mean elevation.*

The greatest mean height of the barometer on the coast of New South Wales takes place in August and September with south-east and southerly winds, and the lowest mean height in December, January, and February with north-west winds. The highest range being 30·92, and the lowest 29·26, over an interval of five years. During winter months, a marked fall in the barometer is certainly to be followed by westerly winds and fine weather, whatever may be the quarter or the conditions under which the wind may be blowing when it commences to fall. During the summer months it may be similarly and as surely depended on as the forerunner of a north-west hot wind. These are two cases in which the barometer may be implicitly relied on to indicate coming change of wind and weather, and there will then be little fear of the wind altering when in this quarter whilst the barometer remains low and steady.

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* Too much faith, however, should not be put in the barometer, unless the observer can combine local experience with the use of the instrument. F. Hixon, Esq. (late Master, R.N.), Superintendent of pilots, lights, and harbours in New South Wales.

During the summer months the barometer generally falls to the approach of a southerly gale whilst the north-east wind is blowing, but this fall must not be implicitly relied on, as southerly gales have been known to occur without any perceptible change in the glass. After the strength of a south-west or southerly gale is over, the barometer will rise to about 30 inches, when fine weather and a gradual change of wind to N.E. may be expected.

Fogs rarely occur, except in the summer months, and then seldom last longer than from day dawn to 10 a.m.

CURRENTS off the SOUTH COAST of AUSTRALIA.—Near cape Leeuwin, and off the south coast of Australia, the current at all times of the year appears to be principally influenced by the prevailing winds, some vessels having experienced constant northerly currents, running from one to 1½ knots, and changing to N.E. as they approached the south-west coast of Australia; while others have been set as much as 7° to the eastward, with little to the northward, in the run from the cape of Good Hope to Bass strait.

From cape Leeuwin to the archipelago of the Recherche the current has been found to run easterly, in a parallel direction with the coast, being strongest between D'Entrecasteaux point and King George sound, where its velocity is sometimes 1½ knots. From the archipelago, round the Australian bight, to cape Northumberland, it has less strength than to the southward of those limits; and as Bass strait is approached it is again experienced running to the eastward and south-eastward at the rate of one to 2½ knots. In the strait, the flood stream coming from the eastward, and near King island meeting another flood, coming from the south-westward along the west coast of Tasmania, the easterly stream is overrun and its influence is not again felt till on the meridian of cape Howe, where it is experienced running at the rate of one knot to the eastward, and dissipating itself in the waters of the Pacific.

By this it will appear that off the south coast a current generally will be found running to the eastward or south-eastward, apparently following the configuration of the coast line, particularly after or during the prevalence of the strong westerly winds which blow during nine months of the year in the South Indian ocean, and which throw a great body of water upon the western shores of Tasmania. During summer, when these winds are only occasionally experienced on the south coast, and strong southerly gales detach large masses of ice from the frozen Antarctic regions, and drive them as far North as 46° and 45° S., the easterly current abates in strength, and after a fresh easterly wind it is not unfrequently found to change its direction to the N.W.

In the offing between cape Leeuwin and cape Otway the currents appear to be mainly influenced by the prevailing winds, which are strong westerly during nine months of the year. Except during easterly winds (which prevail from January to the beginning of April), vessels approaching the western entrance of Bass strait will experience a current setting to the south-east out of the Great Australian bight at rates ranging from a half to 2½ knots an hour according to the strength and duration of the westerly winds.

Near the shore with easterly winds a current has been found setting to the westward, but this current is probably confined to the vicinity of the coast.

Vessels making the land about cape Otway during the continuance of strong westerly winds should be prepared for a southerly set; H.M.S. *Challenger*, in 1866, having been set to the southward 30 miles in 24 hours. H.M.S. *Adventure* in October 1874, one day before entering Bass strait from the westward, experienced a current setting S. 44° E. (true) 20 miles in 24 hours, after strong winds from N.E. and N.W.

From cape Northumberland to west entrance of Bass strait, in October, November, and December, when south-westerly breezes mostly prevail, a current may be expected to run to the eastward. In January, February, and March a westerly current may be expected; but as these currents do not appear to be at any time continuous, they cannot with certainty be allowed for. They will be found stronger as the coast is approached, and strongest off the various headlands, such as capes Bridgewater and Nelson, Moonlight head, and more particularly cape Wickham. Off cape Wickham there is occasionally a very strong current, which may be more correctly termed a tidal stream accelerated by the wind. Close to the cape it is said to run as much as 5 knots, but 2 knots is the ordinary velocity at spring tides.

The current off cape Wickham loses in force as its distance from the shore is increased, and is scarcely felt at a distance of 6 miles. It is probable that a westerly gale will keep up the flood-stream which here sets to the eastward, and that an easterly gale will have an opposite effect. Upon the west coast of King island a current was often found setting to the north-west. Southward and westward of King island the currents or tidal streams are irregular; they are known at times to be very strong, but they were never experienced of any strength during the survey.

Sealers report that in the strait between King island and Tasmania a current will be found setting eastward during easterly weather.

CURRENTS and TIDE STREAMS in BASS STRAIT.—The flood stream from the eastward, after attaining high water at the Furneaux islands passes on towards Hunter and King islands, where, to the eastward of King island, it meets another flood stream from the south-westward (as remarked at page 402), and the high water then made is 2 hours after it is high water at Furneaux group.* This applies more especially to the middle of the strait, and is what Captain Flinders there found with winds blowing across it; but the bight on the north side, between cape Otway and Wilson promontory, seems to be an exception, and, in fact, lies out of the direct set of the tide streams. At the West entrance of Bass strait, along the coast between cape Otway and port Phillip, the flood stream comes from the westward. In running from port Phillip to the promontory H.M.S. *Investigator* was set E. ¾ S. 35 miles in the day; but it then blew a gale from the West and S.W.

Navigators find an easterly current running with considerable strength, when passing the strait at two or three degrees to the eastward of Furneaux islands; and it was this current so found which led Admiral Hunter to the first opinion of the existence of an opening between New South Wales and Tasmania.†

CURRENTS on NORTH and WEST COAST of TASMANIA.—The flood stream runs to the westward along the north coast of Tasmania; but near the coast, between Circular head and cape Portland, there is almost a constant current running to the eastward during the greater part of the year.

The flood stream runs to the northward along the west coast of Tasmania; and there is also a current generally setting in the same direction, particular during the prevalence of south-west and southerly winds, which throw a great body of water upon this shore from the Great Southern ocean.

CURRENTS OFF the COAST of NEW SOUTH WALES.—It is a remarkable fact that while the prevailing winds on the east coast of Australia are from N.E. in summer and S.W. in winter, the current almost constantly sets to the southward along this part of the coast, in a broad serpentine belt, extending 20 to 60 miles from the land, at a rate varying from half a knot to 3 knots, the greatest strength being near the most projecting points. Beyond the above limits there seems to be no constancy in its direction; and close in with the shore, especially in the bights, there is very commonly an eddy, setting to the northward, from a quarter of a knot to one knot. It is along the southern part of this coast that the current runs the strongest; and towards cape Howe it takes a direction to the eastward of South, whereas in other places it usually follows the line of the shore.

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* I have never experienced an easterly current in Bass strait.

There is certainly a surface drift setting to the eastward, and I have never known any wreckage washed in the opposite direction. A long succession of easterly winds in the summer time is the only cause, which, I should think, would produce an opposite result. Staff-Commander H. G. Stanley.

† The easterly current found by Admiral Hunter is very likely a deflection of the southerly current of the east coast of Australia. The loss of a large vessel wrecked on the east coast of Flinders island, was attributed to a current setting south-westward. Staff Commander H. G. Stanley.

Captain Stokes says, that during mid-winter months, in easterly and southerly gales, a current of one to 2½ knots to the southward was felt in H.M.S. *Beagle*, at 40 to 90 miles from the coast, between Jervis bay and port Stephens; and H.M.S. *Rainbow*, in her passage from Tasmania to port Jackson, in February 1827, experienced an easterly current, which set her 36 miles in 24 hours.

Vessels bound to the northward during the winter season will not only avoid the current, but ensure getting smooth water, by keeping inshore, though, owing to the proximity of the land, the wind may be puffy.

Mr. John Ross, harbour master, of Moruya river, says:—"The southerly current prevails a few miles from the coast; but close inshore there is often a strong northerly set, frequently 1½ knots."

DIRECTIONS.

For SPENCER GULF and PORT ADELAIDE.[*]—A vessel from the Indian ocean having proceeded eastward on the parallel of 38° S. until on the Meridian of 115° E., as recommended in the Introduction and bound for Spencer gulf or port Adelaide, should from this position, run about 1,000 miles on a N. 82 E. *true* course for cape Borda, the west end of Kangaroo island, the light on which may, in clear weather, be seen at the distance of 30 miles.

Having sighted cape Borda or the Neptune isles, enter Spencer gulf as directed at page 166; or if bound through Investigator strait for port Adelaide, proceed as directed at page 197.

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[*] *See* Admiralty charts and plans: Australia, general chart, southern portion, sheet II., No. 2,759; scale, d = 1 inch; cape Catastrophe to Nuyts Archipelago, No. 1,061; scale, m = 0·08 of an inch; gulfs of St. Vincent and Spencer, No. 2,389 a and b; scale, m = 0·13 of an inch; Macdonnel sound, No. 2,152; scale, m = 1·5 inch; port Adelaide and Holdfast bay, No. 1,752; scale, m = 1 inch: also Chapter II.; winds, page 627 and currents, page 633. For local directions in gulfs of St. Vincent and Spencer, refer to the Index.

Vessels entering the gulf of St. Vincent may sight from a considerable distance, the high range of hills on the eastern side, extending from the southward to mount Lofty, at the northern extremity of some table land.

This mount, which is the most elevated part of the range, bears N.N.E. ¼ E., distant 50 miles from cape Jervis. For about 18 miles up the gulf the land is high and bold, but above that the shore becomes very low, with sand-hummocks upon it; and the same description of coast prevails to the head of the gulf.

After passing the high coast-land the water shoals some distance out, and in some places, within 10 miles of the lighthouse, there are 5 fathoms about 4 miles from the beach. Great attention must be paid to the soundings, especially at night, and in running up for the lighthouse, it would be most desirable to keep between 6 and 7 fathoms water, not going into less than 6 fathoms, as within that depth it shoals suddenly. In these soundings the lighthouse will be made nearly ahead, and when bearing about N.E. by E., distant 4 miles, it will be necessary to heave-to for a pilot, the mail agent, and the health officer, who will go off from the pilot and telegraph station. As the telegraph gives intelligence at Adelaide of all arrivals, commanders of vessels are requested to make their numbers on approaching the lighthouse.

For PORT ADELAIDE by BACKSTAIRS PASSAGE.—If intending to enter gulf St. Vincent by Backstairs passage, the neighbourhood of Mitchie reef should be avoided, which, although not believed to exist, has been stated to lie about S. by W. ¾ W., 30 miles from cape Couëdie, the south-west point of Kangaroo island. Young rocks, lying S.E. by E. ¾ E., 32 miles from the same cape, are not very dangerous, as one of them is 30 feet high. At 10 or 12 miles to the southward of cape Willoughby, the east point of Kangaroo island, after south-west gales, there is a tide race with heavy breaking seas, dangerous for deeply laden vessels or small craft. This race will be cleared to the eastward by keeping Sturt light, on cape Willoughby, to the westward of N.N.W., when proceed as directed at pages 209–210.

To PORT PHILLIP and to SYDNEY through BASS STRAIT.—Ships approaching Bass strait from the westward now generally keep in about 42° or 43° S. latitude after passing the meridian of cape Leeuwin, until the meridian of 138° E. longitude is reached; they then haul up about N.E. or N.E. by N. to make Moonlight head; this course intersects the parallel of 40° S. at about 120 miles west of King island.

During strong westerly winds it is advisible to maintain the 40th parellel after passing the meridian of cape Leeuwin, and with the view of giving King island a wider berth, to haul up for Moonlight head on reaching the meridan of 135° E.

In approaching Bass strait the winds and currents must be carefully attended to, particularly during the prevalence of south-west or southerly gales. Several vessels have been wrecked on King island by steering a direct course for cape Otway, undue weight having been given to the dangers on the south coast of Australia and the much greater dangers on King island apparently neglected. It is strongly recommended, therefore, that Moonlight head, or some point of the coast even more to the westward, should be made, as the soundings on this part of the coast are well defined and regular. The 100 fathoms line of soundings is 35 miles to the south-westward of Moonlight head, and the depth of 40 fathoms will be found at 10 miles from that headland. When approaching Bass strait in thick weather, or when the navigator is uncertain of the vessel's position, the soundings should not be reduced to less than 40 fathoms.* Soundings of 60 or 70 fathoms will be found at 25 or 30 miles westward of King island. Outside of this limit the soundings deepen rapidly to no bottom at 100 fathoms. Inshore of 60 fathoms the depths are irregular, but 30 fathoms will be found at a distance of 4 miles to the N.W. of cape Wickham.

CAUTION.—In approaching King island from the westward, especially during thick or hazy weather, caution will be required on account of the variable strength of the current, and the use of the lead is enjoined. *See* page 295.

Commanders of iron ships, especially of those newly built, are cautioned as to the necessity of ascertaining the errors of their compasses on approaching the Australian coast.

Backstairs Passage to Cape Northumberland.—From 3 miles East of cape Willoughby lighthouse to 5¼ miles S.W. of cape Banks, the course is S.E. 163 miles. This course passes 15 miles to the westward of the Margaret Brock reef and in sight of the light on it, 10 miles S.W. of cape Dombey in 26 fathoms, 8 miles S.W. of cape Buffon in 35 fathoms, and is nearest to the coast when the Carpenter rocks bear N.E. 5¼ miles distant, the depth then being 35 fathoms. Thence to 6 miles South of cape Northumberland the course is S.E. by E. ½ E. 20 miles. It is impossible to give exact information about the currents on the coast between cape Willoughby and cape Northumberland; the strongest currents seem to be produced by a cause which is not apparent to a local observer, such as heavy gales at sea which do not reach the coast.

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* *See* Admiralty chart, Australia, south coast, sheet IV., No. 1,062; scale, $m = 0 \cdot 25$ of an inch; and Bass strait, No. 1,695 b; scale, $m = 0 \cdot 20$ of an inch.

To the southward of cape Jaffa a current sets to the eastward about one knot an hour during westerly gales, at the same time time near cape Jaffa the current runs to the northward.

Between Rivoli bay and cape Northumberland do not shoal the water to less than 25 fathoms at night; this depth will be found on the average rather more than 5 miles off shore.

If bound to PORT PHILLIP.[*]—Having arrived in the West entrance of Bass strait, and clearly distinguished cape Otway, which it is desirable to round at a distance of not less than 3 or 4 miles, and the lighthouse bears W. by N. ½ N., distant 6 miles, the course and distance to port Phillip heads will be N.E. 56 miles, passing 3½ miles outside Henty reef, and all dangers will be cleared by giving the coast a berth of not less than 2 miles. Should the cape be rounded early in the evening, with a fresh southerly wind, beware of overrunning the distance, as a strong current after a prevalence of southerly gales, often sets along the land to the N.E. When abreast of Split point, if a stranger finds there will not be sufficient daylight to get into pilot waters, he should stand off and on shore till daylight, not shoaling the water to less than 20 fathoms.

After passing Split point, if the weather be clear, Arthur's seat will be seen rising inland over the waters of port Phillip before the lower and nearer land in that direction becomes visible. The land about cape Schank will next be seen to the eastward, appearing at first like a long low island trending to the S.E. On nearing the entrance Barwon head will open out on the port bow; but in thick, or hazy weather, care must be taken not to mistake this for port Phillip heads, which in several instances has lead to vessels going on shore, (*see* page 346).

By night to avoid being drawn into Barwon bight, vessels should open Shortland bluff low light which will be first seen on a N.E. by E. bearing.

A vessel should on no account be hove to when waiting for daylight near port Phillip heads, but should keep a good offing. The lead should be carefully attended to.

BASS STRAIT.[†]—When the vessel's position between cape Otway and King island is ascertained, an easterly course may be shaped as desired or for Rodondo island, in clear weather this island is visible at the distance of 30 miles from a ship's deck.

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[*] *See* Admiralty charts, port Phillip, No. 1,171a; scale, $m = 1$ inch; and port Phillip entrance, No. 2,747a; scale, $m = 3$ inches.

[†] *See* Admiralty chart, Bass strait, No. 1,695 a; scale $m = 0{\cdot}20$ of an inch. For anchorages in Bass strait, when going eastward, see page 425.

BASS STRAIT to SYDNEY.[*]—Having passed Kent group, a N.E. by E. course will lead about 60 miles seaward of cape Howe; but should it blow hard from the southward, a more easterly course should be steered, to avoid Ninety-mile beach which would then be a dangerous lee shore, extending from Corner inlet for 150 miles, or nearly to cape Howe. From a known position eastward of cape Howe, steer northward along the East coast for port Jackson, at such distance from the land as the wind and other circumstances would suggest, bearing in mind that the current generally sets to the southward along the East coast at a distance of 20 to 60 miles from the land. After having made the light on the South Head of port Jackson enter the port as directed on page 620.

If at any time during the months of June, July, and August the weather is unsettled, with the wind unsteady and flying about the compass, with gloomy weather and occasional rain, an easterly gale may be looked for, which will last for two or three days, veering from N.E. to E.S.E., accompanied with heavy leaden clouds and sheets of incessant blinding rain. The barometer is not in any way affected by the approach or continuance of these gales, standing steadily at 30·12 to 30·18.

A mountainous sea is rolled in on the coast, which being a dead lee shore, there is little chance for small craft caught close in being able to gain an offing. There is nothing, however, to prevent a well-appointed ship, having an offing, from holding it, by watching the shifts of wind, and keeping as long as prudent on the starboard tack, thus bringing the prevailing current setting to the southward under her lee.

The soundings off this coast to the 100 fathoms line have been carefully obtained; and being accompanied with the nature of the ground at various depths, a vessel making the coast in thick weather, and uncertain of her position, will by sounding get a correct idea of her distance from the land. The 100 fathoms line seems to be nearly on the edge of the bank of soundings before dropping into the deep ocean water. It is worthy of note that the current seems to follow the direction of the edge of this bank.

South-western Entrance of Bass strait.—The entrance into Bass strait between King island and Hunter group is not recommended, on account of Bell reef and Reid rocks which lie in it. If a vessel from necessity or choice enters Bass strait by this passage, she should keep to the southward of Reid rocks and Bell reef, the latter being cleared at the distance of 2½ miles to the southward of it, by steering for Black Pyramid on an East bearing. Or, with a commanding breeze, a vessel may pass between King island and Reid rocks without danger, by paying attention to the tidal stream, which sets across the channel.

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[*] *See* Admiralty charts, Bass strait, No. 1,695 a and b; scale $m = 0{\cdot}20$ of an inch: Bass strait to Gabo island, No. 1,016; scale, $m = 0{\cdot}2$ of an inch; Gabo island to Montagu island, east coast. sheet I., No. 1,017, scale $m = 0{\cdot}5$ of an inch; Mantagu island to Beecroft head, Sheet II., No. 1,018; scale $m = 0{\cdot}5$ of an inch; and Beecroft head to port Jackson, sheet III., No. 1,020; scale, $m = 0{\cdot}5$ of an inch.

From the Black Pyramid steer N.E. by E. and pass about one mile northward of Albatross islet, from whence a vessel bound to port Dalrymple or Launceston may steer E. ½ N., to round Mermaid rocks off the north extreme of Three Hummock island, then shape an E. by S. ½ S. course for port Dalrymple and proceed as directed in page 442.

A vessel bound north-eastward through Bass strait from Albatross islet may continue N.E. by E. for Kent group.

For HOBART and SYDNEY by the route SOUTH of TASMANIA.[*]—A vessel having, as recommended in the Introduction, run down her longitude through the Indian ocean on or about the parallel of 39° S. to the meridian of 115° E., should, by the time she reaches the meridian of 145° E., be far enough south to round Tasmania before making the land, in order to avoid falling in with its rocky western coast in the night, from any error in the reckoning, or from being caught on a lee shore by a south-west gale.

For Hobart.—A vessel having arrived at about 10 miles southward of the south-west cape of Tasmania, may proceed E. by N. between Maatsuykers islets and the Mewstone, where there is a clear channel 5 miles wide. From thence 25 miles on the same course will bring a vessel to about 3 miles southward of South cape; she may then proceed through D'Entrecasteaux channel to Hobart, or take the far better route through Storm bay, giving a good berth to the Friar rocks, off Tasman head, and follow the directions given on page 517.

When blowing heavily from the S.W. or southward, especially if unable to obtain observations before making the land, it would be desirable to keep more to the southward, passing South of the Mewstone, and on either side of Pedra Blanca and the Eddystone, according to destination, taking care to avoid Sidmouth rock.

From SOUTH of TASMANIA to SYDNEY.—After rounding South cape, a ship bound to Sydney should give a berth of at least 20 or 30 miles to cape Pillar and the East cape of Tasmania, by which she will escape the baffling winds and calms which frequently perplex vessels inshore, while a steady breeze is blowing in the offing.

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[*] *See* General chart of Tasmania, No. 1,079; scale, $m = 0 \cdot 11$ of an inch.

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To China. [illegible] to China southward of Australia, is only [illegible] during the months of December, January, [illegible] winds may be then expected. This route is not [illegible] northward of Singapore, for during the [illegible] January, February, and March northerly [illegible] in Sunda, Banka, Gaspar, and [illegible] endeavouring to get to the [illegible]. A vessel has been known [illegible] a distance of 500 miles. [illegible] bound to Europe to take [illegible] at all seasons and under [illegible]. But as ships [illegible] the cape of [illegible] the season when such

SYDNEY to BASS STRAIT.*—A vessel proceeding from Sydney to Bass strait, in order to take advantage of the current as far as cape Howe, which appears to run strongest during the summer months, should keep along the outer edge of the 100-fathoms line of soundings, or a distance of 15 to 18 miles from the coast, where the current has been found to run stronger and with more regularity than elsewhere within that limit.

BASS STRAIT, PORT PHILLIP and WESTWARD.—From about 30 miles to the eastward of cape Howe, if the wind is southerly, do not steer a more westerly course than S.S.W., until in lat. 39° 30′ S., on account of the danger to be apprehended from south-easterly or southerly gales upon the Ninety mile beach between cape Howe and Corner inlet. On reaching the parallel of 39° 30′ S., steer about W. by S., leaving Wright rock about 3 miles to the southward, and the south point of Deal island, the south-easternmost of the Kent group, at the same distance to the northward. Having passed the Kent group, continue the same W. by S. course to about 2 or 3 miles southward of the Sugarloaf rock, leaving the Judgment rocks on the starboard hand.

Local experience has, however, shown that with westerly and south-westerly winds the line of coast between Shallow inlet and cape Conran, locally known as the Ninety mile beach, gives smoother water; and as south-westerly winds are the prevailing ones, masters of vessels bound to the westward may often take advantage of the smoother water and an absence of danger to approach the beach, instead of avoiding it. Steam vessels trading between the Gippsland lakes and Melbourne consider it best to adopt this practice.

Easterly gales are not without warning signs; therefore if a vessel did happen to be in-shore when an easterly gale was threatening, she could at once get an offing.

As westerly gales veer to the southward during the summer months, it is advisable to stand towards the Tasmanian coast, and so be ready to take advantage of the shift of wind.

In the winter, and more particularly in the months of September, October and November, the same course cannot be recommended; the

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* *See* Admiralty charts of Australia, general chart, southern portion, No. 2,759 b; scale, $d = 1$ inch; East coast, sheet III., Beecroft head to port Jackson, No. 1,020; sheet II., Montagu island to Beecroft head, No. 1,018; and sheet I., Gabo island, to Montagu island, No. 1,017: scale, $m = 0 \cdot 5$ of an inch. *Also* Charts of Bass strait, Nos. 1,695 a and b; scale, $m = 0 \cdot 20$ of an inch; and Bass strait to Gabo island, No. 1,016; scale, $m = 0 \cdot 2$ of inch.

This is more desirable in the summer, when easterly winds prevail, and a current is said to be experienced on the south-east coast at 20 to 60 miles off shore, running to the N. by E. at the rate of three-quarters of a knot, while in-shore it is running in the opposite direction, with nearly double that velocity. From a position at about 30 miles eastward of cape Pillar, 350 miles on a North course will take a vessel to 15 miles eastward of cape Howe, from whence proceed to Sydney as previously directed at page 640.

ROUTE to the WESTWARD SOUTH of AUSTRALIA.—Ships bound from Sydney to Europe or Hindostan may, from December to March, proceed by the southern route through Bass strait, or round Tasmania, easterly winds being found to prevail in the strait and along the south coast of Australia at that season, when ships have made good passages to the westward, by keeping to the northward of 40 S., and have passed round cape Leeuwin into the south-east trade wind, which is there found to extend farther South than during the winter months. In adopting this route advantage must be taken of every favourable change of wind, in order to make westing; and it is advisable not to approach too near the land, on account of the south-west gales which are often experienced, even in the summer, and the contrary currents, which run strongest in with the land. The prevalence of strong westerly gales renders the Southern route very difficult, indeed, generally impracticable, for sailing vessels, in the winter, although the passage has been made at that season by ships in good condition, which sailed well. The Northern route, through Torres strait, is preferred in the winter months, directions for which are given in Vol. II. of this work.

To China.—The passage to China southward of Australia, is only practicable for sailing vessels during the months of December, January, and February, as easterly winds may be then expected. This route is not recommended, even if not bound northward of Singapore, for during the months of November, December, January, February, and March northerly winds and southerly currents prevail in Sunda, Banka, Gaspar, and Carimata straits, and it is a tedious process endeavouring to get to the northward under such adverse circumstances. A vessel has been known to take 30 days from Sunda strait to Singapore, a distance of 500 miles.

It is not intended to recommend sailing ships bound to Europe to take the Western route, for the route by cape Horn, at all seasons and under all circumstances, has always been considered the shortest. But as ships frequently do proceed westward, from Australia to India, to the cape of Good Hope and Europe, it is necessary to point out the season when such passages could be made with most advantage.

SYDNEY to BASS STRAIT.*—A vessel proceeding from Sydney to Bass strait, in order to take advantage of the current as far as cape Howe, which appears to run strongest during the summer months, should keep along the outer edge of the 100-fathoms line of soundings, or a distance of 15 to 18 miles from the coast, where the current has been found to run stronger and with more regularity than elsewhere within that limit.

BASS STRAIT, PORT PHILLIP and WESTWARD.—From about 30 miles to the eastward of cape Howe, if the wind is southerly, do not steer a more westerly course than S.S.W., until in lat. 39° 30′ S., on account of the danger to be apprehended from south-easterly or southerly gales upon the Ninety mile beach between cape Howe and Corner inlet. On reaching the parallel of 39° 30′ S., steer about W. by S., leaving Wright rock about 3 miles to the southward, and the south point of Deal island, the south-easternmost of the Kent group, at the same distance to the northward. Having passed the Kent group, continue the same W. by S. course to about 2 or 3 miles southward of the Sugarloaf rock, leaving the Judgment rocks on the starboard hand.

Local experience has, however, shown that with westerly and south-westerly winds the line of coast between Shallow inlet and cape Conran, locally known as the Ninety mile beach, gives smoother water; and as south-westerly winds are the prevailing ones, masters of vessels bound to the westward may often take advantage of the smoother water and an absence of danger to approach the beach, instead of avoiding it. Steam vessels trading between the Gippsland lakes and Melbourne consider it best to adopt this practice.

Easterly gales are not without warning signs ; therefore if a vessel did happen to be in-shore when an easterly gale was threatening, she could at once get an offing.

As westerly gales veer to the southward during the summer months, it is advisable to stand towards the Tasmanian coast, and so be ready to take advantage of the shift of wind.

In the winter, and more particularly in the months of September, October and November, the same course cannot be recommended; the wind during these months does not shift for a continuance, but is constantly backing to the west-north-westward.

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* *See* Admiralty charts of Australia, general chart, southern portion, No. 2,759 b; scale, $d = 1$ inch ; East coast, sheet III., Beecroft head to port Jackson, No. 1,020 ; sheet II., Montagu island to Beecroft head, No. 1,018 ; and sheet I., Gabo island, to Montagu island, No. 1,017: scale, $m = 0 \cdot 5$ of an inch. *Also* Charts of Bass strait, Nos. 1,695 a and b ; scale, $m = 0 \cdot 20$ of an inch ; and Bass strait to Gabo island, No. 1,016 ; scale, $m = 0 \cdot 2$ of inch.

From the Sugarloaf to West entrance of the Strait.—From the Sugarloaf to cape Wickham, the north end of King island, the course and distance are W. by S. 124 miles, with nothing in the way; it is better to steer 15 or 20 miles to the northward of King island, if the winds permit.

Should the wind hang to the westward of North, a course may be safely directed for the north extreme of Three Hummock island, passing afterwards to the northward or southward of King island as the winds may be most favourable.

BASS STRAIT to St. VINCENT or SPENCER GULFS.*—From the middle of the West entrance of Bass strait, between cape Otway and King island, the course and distance is W. ¾ N. 180 miles to a position about 30 miles south-westward of cape Northumberland, from whence steer N.W. by N. 180 miles to Backstairs passage, and proceed as directed at pages 209, 210.

If bound to Investigator strait or Spencer gulf, from 30 miles south-westward of cape Northumberland, the course and distance will be N.W. by W. 200 miles to about 15 southward of cape Couëdie, the south-west point of Kangaroo island. From thence round the west end of Kangaroo island at such a distance as the nature of the wind and other circumstances may render most desirable, and enter Investigator strait or Spencer gulf as directed at pages 166 and 197. In the event of threatening weather from the southward or south-westward, care must be taken to secure a good offing, to avoid what would then be a lee shore between cape Otway and Encounter bay, and when approaching the south-west part of Kangaroo island a good look out must be kept, especially for Mitchie reef.

From cape Northumberland to Spencer gulf.—The S.W. rock of the Young rocks, which is the danger farthest South of Kangaroo island, and only 5 feet above water, bears from cape Northumberland N.W. by W. ¾ W. 193 miles. The course from 7 miles South of cape Northumberland to a position 15 miles South of the S.W. Young rocks is W.N.W. 188 miles.

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* *See* Admiralty charts, sheet IV., Glenelg to cape Otway, No. 1,062; scale, $m = 0·25$ of an inch; sheet III., Australian bight to cape Jervis, No. 1,061; scale, $m = 0·08$ of an inch; St. Vincent and Spencer gulfs, No. 2,389 a; scale, $m = 0·13$ of an inch; cape Jervis to Guichen bay, No. 1,014; scale, $m = 0·25$ of an inch; Guichen bay to Glenelg, No. 1,015; scale, $m = 0·25$ of an inch.

The same course continued passes 16 miles S.S.W. of Lipson reef, and the same distance S.S.W. of the Southern Casuarina islet off cape Couëdie, the whole distance from the position South of cape Northumberland to the latter position, on the course given, being 225 miles. From the position S.S.W. of cape Couëdie a N.N.W. course may be steered for 30 miles, until cape Borda bears N.E. by E. 12 miles distant; then steer N. by E. ½ E., which leads into Spencer gulf midway between the Gambier isles and cape Spencer.

In the winter, with westerly or southerly winds, a vessel should steer to the westward of the course given between cape Northumberland and cape Couëdie, as there will almost certainly be a set of nearly a knot an hour to the eastward. In the summer, with fresh south-easterly winds, a current will be found running with about the same strength to the N.W.

During the summer the intercolonial trading vessels frequently run from cape Northumberland through Backstairs passage and Investigator strait into Spencer gulf, by adopting which course they get smoother water, and are more sure of their position, through passing three lighthouses instead of one, although the distance to be traversed is somewhat greater. In the winter it is far better to take the outer route, westward of Kangaroo island.

Two or three instances of vessels running into D'Estree bay, Kangaroo island, after having steered a course from the south-east to enter Backstairs passage, can only be accounted for by supposing a strong set to the westward off Coorong beach; but this has very seldom occurred, and no such current was ever experienced by the surveying schooner between Kangaroo island and Lacepede bay.

BASS STRAIT to CAPE LEEUWIN.—A vessel from Bass strait bound round cape Leeuwin is recommended, with a favourable wind, to shape a course which will lead about 150 miles southward of that cape; but in winter, when the prevailing winds are from the westward, and veering from N.W. to S.W. or South, the navigator, having then plenty of sea room, may take advantage of every shift of wind to make the given course to the westward; and is recommended not to approach the coast of the Great Australian bight with the idea of meeting more favourable winds near the land, which, with southerly or south-westerly gales; would become a most dangerous lee shore.*

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* *See* Admiralty charts of Australia, general chart, Southern portion, No. 2,759 b; scale, $d=1\cdot0$ inch, Sheet II., cape Arid to Australian bight, No. 1,060, scale, $m=0\cdot08$ of an inch; sheet I., Perth to cape Arid, No. 1,059, scale, $m=0\cdot08$ of an inch; sheet IV., Glenelg river to cape Otway, No. 1,062; scale, $m=0\cdot25$ of an inch; and cape Catastrophe to Nuyts archipelago, No. 1,061; scale, $m=0\cdot15$ of an inch; winds, page 622, currents, page 633.

The westerly winds, however, are neither so strong nor constant near the south coast of Australia in the winter months as they have been experienced at a great distance from the land.

In June a colonial brig arrived at King George sound from Hobart in 19 days; and an open whale boat, employed sealing along the coast, in the same month arrived from the eastward; in July a small vessel of about 25 tons also arrived from the eastward. In August a vessel has reached Swan river from King George sound in 7 days. In February 1872, H.M.S. *Clio* made the passage from Hobart to the entrance of King George sound under sail in 20 days; with the exception of a westerly gale in lat. 44° 27′ S., long. 145° E., which lasted for twenty hours, the wind was moderate.

The worst months for making a passage to the westward are September, October, and November, during these months westerly gales are of frequent occurrence, the wind sometimes hanging from W.S.W. to W.N.W. for more than a week at a time, and blowing very strong. During the other months of the year, northerly winds are very common

The Introduction to this volume having pointed out the route recommended for making the voyage from the cape of Good Hope to the south coast of Australia; an outline of the route westward through the Indian ocean to the cape of Good Hope, and that eastward through the Pacific round cape Horn, may be useful in this work.

CAPE LEEUWIN to MAURITIUS and CAPE OF GOOD HOPE.*—From off cape Leeuwin steer north-westward into the strength of the south-east trade wind, which is generally found between the parallels of 15° and 20° S., and where the equatorial current sets to the westward. Having reached the parallel of 19° or 18° S., in summer, or two or three degrees nearer the equator in winter, continue westward for Mauritius, if bound there, passing 70 or 80 miles south-eastward of Rodriguez island; but at a greater distance, between November and April on account of the violent hurricanes which occur at this season. Hurricanes are experienced not only in this locality, but in the space between these islands and the west coast of Australia.

For the Cape of Good Hope.—A vessel not touching at Mauritius should, when south of Rodriguez island, steer so as to pass the south-east extreme of Madagascar at a distance of 90 or 100 miles, and continue the same course for the coast of Africa, about Algoa bay. Or she may even make the coast as far north-eastward as port Natal, to profit by the Agulhas current, to assist her round the cape of Good Hope.

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* *See* Admiralty general chart of Indian ocean, cape of Good Hope to Australia, No. 2,483; scale, $d = 0 \cdot 2$ of an inch.

PORT PHILLIP and SYDNEY to CAPE HORN.[*]—A vessel bound for Europe by way of cape Horn, on leaving port Phillip should, with a westerly wind proceed through Bass strait, and passing a league southward of Kent group, run out about E. by N., and having cleared Wright rock, Endeavour reef, and the Sisters isles, steer for a position between the Snares and Auckland isles, southward of New Zealand, in lat. 49° S., long. 165° E.

Westward of Tasmania.[†]—If on leaving port Phillip the wind should be inclined to blow from the East or N.E., it may be desirable to run out south-westward, between cape Otway and King island, and having passed the north end of the island, haul up about S.S.E., taking care, while proceeding along the west coast of Tasmania, to prepare for the prevailing westerly or south-westerly winds, when this coast becomes a dangerous lee shore. Having rounded the outlying dangers off the south coast of Tasmania, proceed for the position before mentioned, between the Snares and Auckland isles.

From SYDNEY.[‡]—At all seasons, and from whatever quarter the wind may blow, it is advisable on leaving port Jackson to proceed to the southward rather than to the north of New Zealand, as in the latter route a vessel's progress to the eastward would be probably impeded by adverse winds and currents. Advantage therefore should be taken of the most favourable winds for either reaching the before-mentioned position, between the Snares and Auckland islands; or, if baffled by southerly winds and favoured by fine weather, the passage through Cook strait may be taken with advantage, especially in the spring and summer season.

From NEW ZEALAND Eastward to CAPE HORN.[§]—The course frequently pursued between the 50th and 60th parallels, and even in higher latitudes in this great extent of ocean, would, with a clear sea and favourable weather, doubtless ensure the quickest passage, as being the shorter distance; but experience has proved that at nearly all seasons of the year so much time is lost at night and in thick weather, and even serious danger incurred in avoiding the great quantities of ice met with in these higher latitudes, that a parallel even as far North as 47° has been adopted with advantage. Between this latter parallel and that of 50°, it is believed the mariner will experience steadier winds, smoother water, absence of ice, and will probably make as short a passage, and certainly one in a more genial climate, and with more security, than in a higher latitude.*

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[*] *See* Admiralty charts of Australia, Southern portion, No. 2,759 b; scale, $d = 1$ inch; Bass strait, Nos. 1,695 a and 1,695 b; scale, $m = 0{\cdot}2$ of an inch; and general chart of New Zealand, No. 1,212; scale, $m = 0{\cdot}04$ of an inch; also Chapters IV. and V.; winds, page 628, currents, page 634; and directions, page 639.

[†] *See* Admiralty chart of Tasmania, No. 1,079; scale, $m = 0{\cdot}11$ of an inch; also Chapters VI. and VII., and winds, page 629.

[‡] *See* Admiralty charts of Australia: east coast, sheet III., Beecroft head to port Jackson, No. 1,020; sheet II., Montagu island to Beecroft head, No. 1,018; and sheet I., Gabo island to Montagu island, No. 1,017; scale, $m = 0{\cdot}5$ of an inch; also Chapter VIII.; winds, page 630, currents, page 635, and directions, page 643.

[§] Captain Gill, late commander of the ship *Monarch*, who has made sixteen successful voyages from Australia round cape Horn, at first adopted the route between the parallels of 52° and 56° S.,; but so much time was lost in heaving to at night and in thick weather, to avoid the great quantities of ice he met with, that he has since preferred the parallel of 47° S. for making his easting. He has experienced on this parallel steadier winds, smoother water, and has been less obstructed by ice; he considers that he has made his passage in less time, and with much more comfort to all on board, than on a more southern parallel.

A vessel pursuing the route suggested above should, from the position southward of the Snares,† proceed eastward between the Antipodes and Bounty isles, keeping the parallel recommended to about the meridian of 120° or 115° W., and then gradually incline to the southward, to round Diego Ramirez and cape Horn in proceeding into the Atlantic ocean.‡ The seamen in navigating this wide expanse of ocean, and also for rounding cape Horn, should be provided with the Ice chart published by the Admiralty in 1865, wherein he will find much useful information; and he is further referred to the foot-note in the first paragraph of the Introduction to this volume descriptive of the tempestuous gales, the heavy and irregular seas, the sudden and fitful shifts of wind occasionally experienced in the high latitudes of the South Indian ocean, features which appear to be equally common to those of the South Pacific.

In the neighbourhood of cape Horn, the equinoctial months are, generally speaking, the worst in the year. Heavy gales prevail at those times, though not, perhaps, exactly at the equinoxes. March is usually the most boisterous month in the year. In April, May, and June, the finest weather is experienced. Bad weather often occurs during these months, but not so much as at other times. Easterly winds are frequent, with fine clear settled weather. June and July are much alike, but easterly gales blow more during July. In August, September, and October westerly winds and cold weather prevail. December, January and February are the warmest months, but westerly winds, which often increase to very strong gales, with much rain, are frequent.

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* H.M.S. *Galatea*, in April 1868, passed an iceberg about 450 feet high, and three-quarters of a mile long, in latitude 53° 20′ S., longitude 111° 0′ W.

† A useful boat harbour exists, about the centre of the north-east side of North-east island. For further description of the Snares, see "New Zealand Pilot."

‡ *See* Admiralty General chart of the Pacific ocean, No. 2,683; scale, $d = 0{\cdot}2$ of an inch; also Ice chart of Southern Hemisphere; Wind and Current charts, 1879, for Pacific Atlantic, and Indian oceans; and Admiralty Pilot charts, 1874, for Atlantic Oceans.

H.M.S. *Cossack*, in March 1878, bound from Melbourne to the Falkland islands, when passing 80 miles southward of Staten Island, experienced an indraught towards Le Maire strait, amounting to 30 miles in 24 hours. The following day the usual cape Horn current was found, setting S. 78° E. (true) 34 miles.

The barometer is lowest with N.W. winds, and highest with S.E.; if it fall to 29 inches, or 28·8, a south-west gale may be expected, but it does not commence until the column has ceased to fall.

BOUNTY ISLANDS.*

Variation 17° 20′ E., in 1884.

This little cluster of rocky islets covers a space of 3½ miles East and West, by 1½ miles North and South. The largest may be seen at a distance of 20 miles. At 10 miles South of the eastern island there are 75 fathoms water, fine white sand; and 18 miles E.S.E. of this position, 104 fathoms, fine brimstone-coloured sand.

Captain Bligh, R.N., who discovered these islands in 1788, and from whom the above description is taken, placed the group in lat. 47° 44′ S., long. 179° 7′ E.

H.M. Colonial steam sloop *Victoria*, Commander W. H. Norman, visited the Bounty islands in November 1865, and found outlying sunken rocks very dangerous to approach, about 3½ miles off the W.N.W. side. With the group bearing N.N.W. 2½ miles, soundings in 85 fathoms, shells and sand, were obtained; and at 8 miles distant, 95 fathoms, fine sand of brimstone colour. The group on examination was found to consist of twenty-four small islets, the highest being from 100 to 300 feet high (with 40 fathoms water half a cable off the north-east side), destitute of vegetation, without landing, and the resort of a great number of penguins and other sea birds. Captain Norman places the group in lat. 47° 50′ S. long. 179° 0′ E.

Navigating Lieut. B. Jackson, of H.M.S. *Rosario*, in July 1870, remarks on the Bounty islands:—I counted 20 in all, a half of them not more than 10 or 15 feet out of water; the largest, which is the westernmost but one, is from 8 to 10 acres in extent.

The group might be divided into two clusters, with a rock nearly in the centre of the passage between them, over which the sea was breaking.

Caution.—The sea was seen breaking at from 3 to 4 miles to the westward, probably on the sunken rock reported by Commander Norman.

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* *See* Admiralty chart, No. 2,468, Norfolk island to 65° S.; scale, *d*=3·7 of an inch.

There is also a sunken rock to the southward of the group, bearing from their western extreme S. ½ W., and from the eastern extreme S.W. ½ S. distance 3½ miles or 2¾ miles off shore. These rocks are exceedingly dangerous, and great care should be taken in approaching the islands in thick weather, as they do not break at times for 5 or 10 minutes.

The eastern islet, which is one of the highest, is 280 feet high, lat. 47° 46′ S., long. 178° 57′ E.

The following soundings were obtained; with western extreme of islands bearing N.E. by E., 2½ miles, 71 fathoms, fine light sand and stones; eastern extreme N.N.W. ½ W., 2 miles, 84 fathoms, yellow sand and shells; west extreme, South, 3 miles, 93 fathoms, fine light sand and granite; centre of group, N.E. by E. ½ E., 12 miles, 110 fathoms; with the western extreme of group, bearing N.E. by E., 2½ miles, the ship appeared to be in shoal water, with a white sandy bottom; on getting a cast of the lead 71 fathoms, light sand and shells were found.

The paucity of birds about the islands was remarkable.

ANTIPODES ISLANDS.

Variation 17° 45′ E., in 1884.

This isolated group consists of several detached rocky islands lying nearly North and South over a space of 4 to 5 miles. The largest island is apparently above 1,000 feet high; the perpendicular cliffs of the whole group varying from 200 to 600 feet, and all the islets appear safe to approach or to pass between. Landing appears impracticable. H.M. Colonial steam sloop *Victoria*, Commander Norman, visited the group in November 1865, and places Antipodes islands in lat. 49° 42′ S., long. 178° 43′ E., thus verifying the position by several recent navigators. Experiencing heavy gales from the West and W.N.W., the ship was kept under the lee of the group, and 60 fathoms water found within half a cable of the shore.

Navigating Lieut. Hallet, H.M.S. *Cossack*, 1873, remarks:—Passed along the north shore of the large island at a distance of from one to 2 miles, it has a most barren and inhospitable appearance; close to the north-east point is an island apparently an extinct crater. The cliffs are principally covered with a dark green moss-like vegetation. The position of the small island near to the north-east point of the island is 49° 40′ S. lat., 178° 49″ 45 E. long.

The only place where it would be likely to effect a landing, is a little to the southward of the north-east extreme of the island, there, the cliff having fallen away, has formed a shelving point on which the sea appeared to break lightly; it is sheltered also from the prevailing wind.

It is worthy of remark that between the parallels of 49° 50′ S. and 58° 0′ S., and from the long. of 172° 0′ E. to 162° 0′ W., seaweed has been daily observed.

TIDE TABLE for the COASTS of AUSTRALIA and TASMANIA.

Place.	High Water, Full and Change.	Rise. Springs.	Rise. Neaps.
	h. m.	ft.	ft.
Australia, South Coast.			
West cape Howe - -	9 0	2	
King George sound, Princess Royal harbour.*	11 3	2¼	2
Eucla road - - -	11 5	5	
Fowler bay - - -	noon	5¼	
St. Francis Isles - -	noon	6	
Denial bay - - -	0 15	7	
Streaky bay - - -	0 5	6	
Venus harbour - -	1 30	4 to 5	
Coffin bay - - -	0 45	6	
Spencer gulf, Gambier isles	2 0	5	
„ „ Thorny passage	noon	6 to 8	
„ „ Port Lincoln -	1 50	6	
„ „ Salt Creek cove	3 30	6	
„ „ Franklin harbour.	4 0	5½	
„ „ Plank point -	6 15	6 to 8	
„ „ False bay -	7 0	6 to 8	
„ „ Hardwicke bay	2 30	6	
„ „ Port Victoria -	2 40	5	
„ „ Wallaroo and Tipara bays.	5 45	4 to 5	
„ „ Webling point	6 10	6 to 9	
„ „ Port Pirie -	8 30	9½	
„ „ Lowly point -	7 0	6 to 8	
„ „ Port Augusta†	8 30	9 to 12	
Marion bay - - -	2 5	4	
Kangaroo island, Cape Willoughby.	4 10	6	
„ Antechamber bay -	2 15	4 to 5	
„ Pelican lagoon -	4 0	4	
„ Kingscote harbour -	3 0	5	
Gulf of St. Vincent, Troubridge Shoals.	4 18	7	4 to 6
„ Port Moorowie -	3 10	6	
Second Valley -	3 20	6	
„ Yankalilla - -	3 30	6	
„ Onkaparinga -	4 0	6	
„ Port Adelaide, ‡Semaphore jetty.	4 40	7¾	5
„ Adelaide - -	5 25	8½	5
„ Port Wakefield -	4 40	11	
Port Alfred - -	4 37	8	5 to

Place.	High Water, Full and Change.	Rise. Springs.	Rise. Neaps.
	h. m.	ft.	ft.
Australia, South Coast—cont.			
Encounter bay - -	1 9	4 to 6	
Murray river, Sea Mouth -	0 50	3 to 6	2 to 3
Kingston (Laupede bay) -	0 6	5	
Guichen bay - -	0 37	4	
Rivoli bay - - -	0 33	4	
Port Macdonnell - -	0 2	4	
Portland bay - -	0 30	3	
Port Fairy - - -	0 31	3	
Warrnambool harbour -	0 37	3	
Port Phillip, Lonsdale point	9 42	7	5¾
„ Queen's cliff -	10 50	3	2
„ Nepean point Quarantine station.	10 53	2¾	1¾
„ Dromana bay -	2 19	3	2¼
„ Snapper point -	2 14	2¾	2
„ Ballarine jetty -	2 21	2½	2
„ Henrypoint and Geelong.	2 39	3	2½
„ Williamstown, Hobson bay.	2 31	2¾	2
„ Melbourne quay, near the bridge.	2 48	2¾	2
Port Western, Spit point -	1 0	10	8
„ Bourchier channel.	1 13	10¾	8¾
„ Mussel rock	0 12	8½	6½
„ Woody point	0 50	8	5
Venus bay - - -	11 56	7	
Waratah bay - -	noon	8	
Glennie islands - -	11 44	9	
Refuge cove - - -	0 5	8	
Corner inlet, Rabbit island.	0 14	8	
Entrance to Gipp's Land lakes.	8 30	3	
Gabo island - - -	8 30	3	
Bass Strait.			
King island, Franklin road	0 46	3	
„ Surprise bay -	0 43	3	
„ Sea Elephant bay	0 50	3	
Kent group - - -	11 10	8	
Hummock island - -	10 30	10	

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* At King George sound there is a large diurnal inequality of the times, which sometimes reduces the two daily tides to one.

† At port Augusta, when the wind veers round to West and South and blows strong, the rise has been as much as 16 feet.

‡ Deduced from observations made between September 1867 and February 1868. During these months the a.m. tides were found to rise higher than the p.m. In the winter months the reverse is said to be the case. About the neaps the tides are very irregular.

TIDE TABLE for the COASTS of AUSTRALIA and TASMANIA—*continued.*

Place.	High Water, Full and Change.		Rise.	
			Springs.	Neaps.
	h.	m.	ft.	ft.
Bass Strait—cont.				
Goose island - - -	10	48	9	
Furneaux group, Babel isles	10	5	7	
" Armstrong channel Preservation isle -	10	36	5 to 7	
Tasmania, North Coast.				
Eddystone point - -	8	10	7	
Swan isles - - -	9	16	7	
Waterhouse island - -	10	16	8	
Tamar river, Pilot station	11	10	10	
Port Dalyrmple, George-town.	0	5	10	7
Launceston - - -	1	0	12½	4
Port Sorell - - -	11	35	8 to 9	
Port Frederick - -	11	40	10 to 12	
Don river - - -	11	35	8 to 9	
Forth river - - -	11	30	10	
Leven river - - -	11	45	9½	
Sawyers bay - - -	11	40	9	
Hunter island - -	11	30	8	
Tasmania, West Coast.				
Cape Grim - - -	10	30	8	
Macquarie Harbour, bar -	7	30	3	
Tasmania, South Coast.				
Derwent river - -	8	15	4½	3½
Port Arthur - - -	7	53	4	
Tasmania, East Coast.				
George bay - - -	9	42	3	2
Australia, East Coast.				
Twofold bay - - -	8	15	5 to 7	
Panbula river - -	9	0	4 to 6	
Burmaguey bar - -	9	20	5	
Montagu island - -	8	30	5 to 7	
Bateman bay, Observation point - - -	8	0	4 to 6	
Ulladulla harbour - -	8	30		
Jervis bay - - -	8	30	5	
Shoalhaven rivers - -	8	30	9	6
Wollongong - - -	8	30	6	
Port Hacking - -	8	45	8	7
Botany bay - - -	8	10	8	7
Port Jackson, North head -	8	15	6	
" " Sydney* -	8	38	4	4

* From April to October, at Sydney, the night tide is higher than the day tide, and the reverse for the rest of the year.

TABLE OF POSITIONS*

FOR THE

COASTS OF AUSTRALIA AND TASMANIA.

AUSTRALIA, SOUTH COAST.

Place.	Particular spot.	Latitude, South.	Longitude, East.
		° ′ ″	° ′ ″
Cape Leeuwin - -	Extreme - - -	34 22 0	115 9 0
Black point - - -	Extreme - - -	34 25 0	115 33 0
D'Entrecasteaux point -	Extreme - - -	34 50 0	116 1 0
White-topped rocks -	Western rock - -	35 0 50	116 14 15
Nuyts point - - -	Extreme - - -	35 3 15	116 38 45
West cape Howe - -	Extreme - - -	35 8 0	117 37 30
Maude reef - - -	Centre - - -	35 12 10	117 58 25
Bald head - - -	Extreme - - -	35 6 30	118 1 36

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* The Admiralty charts of Australia and Tasmania, to which this volume refers, have been constructed from the under-mentioned positions :—

King George sound (Commissariat house, near Albany jetty) - - -	Lat. 35° 2′ 20″	Long. 117° 54′ 00″
Adelaide (Snapper point) - - -	„ 34 46 50	„ 138 31 00
Melbourne (Observatory) - - -	„ 37 49 58	„ 144 58 42
Hobart (fort Mulgrave) - - -	„ 42 53 32	„ 147 21 13
Sydney (fort Macquarie) - - -	„ 33 51 42	„ 151 14 00

The longitudes from cape Leeuwin to Nuyts Archipelago are chiefly by Flinders, and mainly deduced from astronomical observations. The longitudes from Nuyts Archipelago to Gabo island, including the north coast of Tasmania, depend on Melbourne Observatory being in 144° 58′ 42″. The longitudes between Gabo island and Sydney with the west, south, and east coasts of Tasmania, depend on fort Macquarie being in 151° 14′. E.

The important meridian of fort Macquarie may yet be open to farther investigation. The late Admiral P. P. King, from numerous observations, considered it to be in 151° 15′ 25″ ; the late Captains F. P. Blackwood and Owen Stanley, and Lieutenant C. B. Yule, for their Australian surveys, adopted 151° 14′ 50″, as reduced from the longitude of Paramatta Observatory, considered in 151° 1′ ; and Captain H. M. Denham, for his observations in the Pacific ocean, in 1856, employed 151° 14′ 40″. Captain J. L. Stokes, for the New Zealand Surveys, adopted 151° 15′ 30″. An analysis of documents in the Hydrographic Office, embracing observations made between the years 1788 and 1851 by numerous navigators and astronomers, places fort Macquarie in 151° 15′ 5″ East.

The longitude of fort Macquarie (deduced from the longitude of Sydney Observatory, in 151° 12′ 42″, as adopted by Mr. Russell, the Government Astronomer of New South Wales, in 1878 - } 151° 13′ 16″ East.

Fort Macquarie being considered $2^{s}\cdot 26$, or 34″, East of Sydney Observatory.

The longitude of fort Macquarie (by electric telegraph from Melbourne Observatory (144° 58′ 42″) is - - - - } 151° 13′ 11″ East.

(By telegraphic determination through Singapore and port Darwin, in connection with Greenwich in 1883, Melbourne Observatory was ascertained to be in 144° 58′ 21″E. "Eighteenth report of Board of Visitors to Melbourne Observatory, 1883.") Thus Fort Macquarie would be in 151° 12′ 50″ E.

Garden island, sometimes used as the place of observation, lies 0° 0′ 47″ East of fort Macquarie.

AUSTRALIA, SOUTH COAST—*continued.*

Place.	Particular spot.	Latitude, South.			Longitude, East.		
		°	′	″	°	′	″
King George sound* -	Commissariat house, near Albany jetty.	35	2	20	117	54	0
Bald isle - - -	Centre - - -	34	55	0	118	28	30
Cape Knob - - -	Summit - - -	34	31	0	119	14	30
Seal isle - - -	Centre - - -	34	46	0	120	28	0
Rocky islets - - -	North islet - - -	34	3	15	120	54	0
Recherche archipelago -	Termination isle - -	34	30	0	121	58	0
„ -	Twin rocks - - -	34	24	0	122	12	0
„ -	West group, south-west point	34	8	0	121	34	0
„ -	L'Esperance bay, Observatory isle.	33	56	0	121	46	0
„ -	Lucky bay - - -	34	0	0	122	12	30
„ -	Cape Pasley, summit -	33	56	0	123	28	0
„ -	South-east isle, south point -	34	20	30	123	28	0
„ -	Pollock reef, west end -	34	35	0	123	27	0
„ -	Round islet - - -	34	5	0	123	49	30
„ -	Eastern group, S.E. islet -	33	51	0	124	8	30
Culver point - -	Extreme - - -	32	55	0	124	30	30
Dover point - - -	Extreme - - -	32	31	30	125	31	0
Great Australian bight -	Head - -	31	29	0	131	10	0
Fowler bay - - -	Port Eyre, Telegraph office -	31	59	43	132	26	39
Streaky bay - - -	Port Blanche, Observation spot	32	48	0	134	13	20
Coffin bay - - -	Mount Dutton - -	34	29	29	135	24	56
Cape Catastrophe - -	West point - - -	35	0	15	135	56	30
Neptune isles - -	South-east islet - -	35	20	15	136	6	45
Spencer gulf - -	Port Lincoln, English church	34	43	22	135	51	24
„ - -	Franklin harbour, Observation spot	33	44	8	136	57	22
„ - -	Port Victoria (Wardang island hut).	34	28	25	137	22	42
„ - -	Tipara lighthouse - -	34	3	0	137	24	0
„ - -	Lowly point - - -	33	0	0	137	47	15
„ - -	Augusta flag-staff - -	32	29	42	137	45	45
Investigator strait -	Cape Borda lighthouse -	35	45	30	136	35	0

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* The longitude of King George sound is the result of chronometric measurements from fort Macquarie (considered in 151° 14′ E.), by Stokes in 1848, and Denham 1858. The longitude by Stokes being 117° 55′ 11″, by Denham 117° 52′ 48″, the mean being 117° 54′ 00″.

The longitude by Fitzroy and Wickham in 1836 and 1837, by meridian distance from Hobart, was 117° 53′ 46″.

Place.	Particular spot.	Latitude, South.	Longitude, East.
AUSTRALIA, SOUTH COAST—*continued.*			
		° ′ ″	° ′ ″
Investigator strait (Althorpe island).	Lighthouse	35 28 0	136 51 0
„	Troubridge lighthouse	35 7 31	137 49 39
Kangaroo island	Marsden point	35 34 30	137 38 0
„	Cape Gantheaume	36 5 0	137 27 0
„	Cape Willoughby lighthouse	35 51 0	138 7 45
Young rocks	Highest rock	36 28 0	137 15 0
Gulf of St. Vincent	Cape Jervis lighthouse	35 36 45	138 5 50
„	Glenelg jetty, lighthouse	34 59 30	138 30 30
„	*Port Adelaide, observation spot, Snapper point.	34 46 50	138 31 0
„	Port Wakefield, inner end of Clinton jetty.	34 13 59	138 1 37
Port Noarlunga	Inner end of jetty	35 9 39	138 28 9
Port Willunga	Observation spot	35 16 22	138 27 36
Port Victor	Flagstaff	35 34 6	138 37 30
Murray river	End of Goolwa jetty	35 31 10	138 47 20
Lacepède bay	Kingston jetty	36 50 16	139 50 56
Cape Jaffa (cape Bernoulli).	Margaret Brock lighthouse	36 57 0	139 40 0
Cape Dombey	Obelisk	37 10 9	139 44 40
Rivoli bay	Penguin island, south point	37 34 40	140 1 19
Cape Northumberland	Lighthouse	38 4 18	140 40 1
Glenelg river	Entrance	38 3 45	140 59 30
Cape Nelson	South extreme	38 26 0	141 33 0
Portland bay	Lawrence rock	38 24 39	141 40 23
Port Fairy	Griffith island, summit	38 23 47	142 14 58
Lady bay	Middle island, summit	38 24 17	142 28 26
Cape Otway	Lighthouse	38 51 45	143 31 0
Port Phillip†	Melbourne observatory	37 49 53	144 58 42
„	Lonsdale point lighthouse	38 17 40	144 36 58

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* By telegraphic determination from Melbourne Observatory, considered to be in 144° 58′ 42″ East.

† The longitude of Melbourne Observatory communicated by the Government Astronomer is nearly identical with the mean of the longitudes by Stokes, Stanley, and Yule, as chronometrically measured from fort Macquarie, considered in 151° 14′. The longitude by Stokes being 144° 59′ 16″; by Stanley's two meridian distances with *Rattlesnake's* 15 chronometers 144^{c} 58′; by Yule's two measurements with *Bramble's* ten chronometers 144° 58′ 48″, the mean longitude thus being 144° 58′ 41″. The longitude adopted by Mr. Robert Ellery, Government Astronomer, in 1865 being 144° 58′ 42″.

By telegraphic determinations through Singapore and port Darwin, in connection with Greenwich, Melbourne Observatory is in 144° 58′ 21″ East. "Eighteenth Report of the Board of Visitors to the Melbourne Observatory, 1883."

Place.	Particular spot.	Latitude, South.	Longitude, East.
AUSTRALIA, SOUTH COAST—*continued.*			
		° ′ ″	° ′ ″
Port Phillip	Shortland Bluff, high lighthouse.	38 16 26,7	144 39 46,17
„	Arthur's Seat	38 21 20	144 57 10
„	Gellibrand point, site of old lighthouse.	37 52 10	144 54 55
„	Geelong Custom house	38 8 52	144 21 47
Cape Schanck	Lighthouse	38 29 42	144 53 12
Port Western	West head, extreme	38 29 15	145 1 55
„	Cape Wollamai, south extreme	38 34 15	145 21 21
Cape Liptrap	Extreme	38 55 0	145 56 0
Wilson promontory	Lighthouse, south-east point	39 8 0	146 25 37
Corner inlet	Entrance point	38 47 0	146 28 20
Rame head	South-west extreme	37 46 30	149 29 0
Gabo island	Lighthouse	37 34 15	149 55 10
BASS STRAIT.			
King island	Cape Wickham lighthouse	39 35 35	143 57 0
„	Stokes point	40 10 0	143 56 0
Bell reef	Centre	40 23 20	144 5 20
Black pyramid	Summit	40 28 30	144 21 10
Rodondo isle	Summit	39 14 0	146 23 30
Curtis isle	S.W. summit	39 28 30	146 39 0
Crocodile rock	Centre	39 21 30	146 30 30
Hogan group	Largest isle, centre	39 13 30	146 59 15
Kent group	Deal island lighthouse	39 29 45	147 19 0
Wright rock	Centre	39 35 10	147 32 0
Sisters isles	North-eastern isle, centre	39 39 0	147 59 15
Flinders island	Babel isles, south-east islet	39 58 0	148 21 30
Hummock isle	North hill	40 1 58	147 46 24
Goose isle	Lighthouse on southern end	40 18 40	147 48 0
Barren island	Cape Barren, islet off it	40 26 0	148 29 50
Banks strait	Swan isle lighthouse	40 43 40	148 7 45
TASMANIA, NORTH COAST.			
Cape Portland	North-west point	40 44 15	147 56 30
Waterhouse isle	North point	40 46 45	147 38 40
Port Dalrymple	Low head lighthouse	41 3 25	146 48 15
Emu bay	Blackman point	41 2 50	145 57 0
North point	Extreme	40 42 30	145 17 10

Place.	Particular spot.	Latitude, South.	Longitude, East.
	TASMANIA, NORTH COAST—*continued.*		
		° ′ ″	° ′ ″
Three Hummock island -	North point, Mermaid rock -	40 22 50	144 57 15
Albatross islet - -	North point - - -	40 22 0	144 39 40
	TASMANIA, WEST COAST.		
Cape Grim - - -	Outer Doughboy islet -	40 40 10	144 40 40
West point - - -	Extreme - - -	40 57 0	144 38 0
Sandy cape - - -	Extreme - - -	41 26 0	144 44 0
Mount Heemskerk -	Summit - - -	41 51 30	145 10 0
Macquarie harbour -	Entrance islet - -	42 11 37	145 13 30
Frenchman Cap - -	Summit - - -	42 16 0	145 50 0
Rocky point - -	Extreme - -	43 0 0	145 30 0
Port Davey - - -	Pyramidal rock near south-east point of the entrance.	43 22 0	145 55 0
Arthur range - -	Summit - - -	43 3 0	146 16 0
South-west cape - -	Extreme point - -	43 33 30	146 2 0
	TASMANIA, SOUTH COAST.		
Mewstone - - -	Centre - - -	43 44 30	146 23 0
La Perouse - - -	Summit - - -	43 30 0	146 46 0
South cape - - -	Three Hillock point - -	43 39 15	146 51 20
Eddystone - - -	Summit - - -	43 51 0	147 2 0
Sidmouth rock - -	Centre - - -	43 47 30	147 7 0
D'Entrecasteaux channel	Cape Bruny, lighthouse -	43 29 40	147 9 45
Bruny island - -	Tasman head, extreme -	43 31 0	147 19 15
„ - -	Cape Delasorte, Kelly point -	43 4 0	147 22 0
Iron Pot islet - -	Lighthouse - - -	43 3 45	147 26 0
Hobart - - -	*Fort Mulgrave - -	42 53 32	147 21 13
Betsy rocks - - -	Southernmost - -	43 4 30	147 30 30
Cape Pillar - - -	Tasman isle, close off it -	43 14 0	148 2 0
	TASMANIA, EAST COAST.		
Maria island - -	Cape Peron - - -	42 44 15	148 2 0
„ - -	Mount Maria - -	42 37 0	148 7 30
Spring bay - - -	Observatory point - -	42 32 18	147 55 50
Freycinet peninsula -	Summit - - -	42 13 0	148 19 0
St. Patrick head - -	North point - - -	41 34 0	140 19 30

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* The longitude of fort Mulgrave, 147° 21′ 13″ is derived from the mean of chronometric measurements extending over the years 1837–1847 by Fitzroy, Wickham, Bethune. Sir J. Ross, Blackwood, and Owen Stanley, and considered to be 3° 52′ 47″ west of fort Macquarie.

Place.	Particular spot.	Latitude, South.	Longitude, East.
TASMANIA, EAST COAST—*continued.*			
		° ′ ″	° ′ ″
Cape St. Helen - -	Bare Top hill - -	41 17 0	148 21 30
Eddystone point - -	Extreme - - -	40 59 0	148 21 0
Mount William - -	Summit - - -	40 54 30	148 14 0
AUSTRALIA, EAST COAST.			
Cape Howe - - -	Extreme - - -	37 30 10	149 59 35
Green cape - - -	Lighthouse - - -	37 15 40	150 4 0
Twofold bay - -	Look-out point lighthouse -	37 4 18	149 55 41
Mount Imlay - -	Summit - - -	37 10 40	149 44 40
Turingal point - -	Extreme - - -	36 47 30	149 58 40
Bunga head - - -	Extreme - - -	36 34 30	150 4 30
Mount Townsend - -	Summit - - -	36 32 30	149 52 30
Mount Dremedary -	Summit - - -	36 18 30	150 2 30
Cape Dromedary - -	Extreme - - -	36 18 40	150 9 0
Montagu island - -	Lighthouse - - -	36 14 30	150 14 30
Binge Binge point -	Extreme - - -	36 0 55	150 10 40
Toragy point - -	North extreme - -	35 54 50	150 10 30
Bateman bay - -	Observation head - -	35 43 58	150 18 30
Brush isle - - -	Centre - - -	35 32 0	150 26 30
Cook's Pigeon House -	Summit - - -	35 21 15	150 17 8
Ulladulla harbour - -	Inner end of pier - -	35 21 41	150 30 25
Jervis bay lighthouse -	North 2 miles from cape St. George.	35 9 15	150 47 22
Beecroft point - -	North extreme - -	35 0 30	150 51 40
Kiama harbour - -	South head, outer extreme -	34 40 25	150 53 15
Red point islets - -	Outermost islet - -	34 29 50	150 57 45
Wollongong head - -	Summit - - -	34 25 30	150 56 10
Hacking head - -	North point - - -	34 4 45	151 11 20
Cape Banks - - -	Extreme - - -	34 0 0	151 15 55
Port Jackson - -	Outer South head lighthouse-	33 51 34	151 18 15
" - -	Fort Macquarie - -	33 51 42	151 14 0
" - -	Garden island - -	33 51 54	151 14 47

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